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CEMENT and ENGINEERING NEWS

Founded 1896

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"Government *Can* Do No Wrong; Industry *Must* Do No Wrong"

UNLESS Industry—all industry—is soon organized and coördinated to take a more *active and forceful* part in the government of this country—the part assigned to it by the National Industrial Recovery Act—conditions will soon reach an impassé.

THEN we shall have either a dictatorship of Brain Trusters without business or industrial experience, more easily influenced by sob stuff than horse sense, or we shall revert to free and unrestrained competition.

THE NIRA and the industry codes that are a part of it have standardized and set minimum limits to costs; business and industry were supposed to be given freedom to meet those costs by fair trade practice agreements, including posting of prices, establishment of standard terms, discounts, etc.

IN some few instances, probably, this freedom has been abused, and the result is that dynamite has been placed in the hands of government bureaucrats, Brain Trusters, and members of Congress, to destroy all the NRA was set up to accomplish for industrial and economic recovery.

IF Industry really wants planned business recovery, it is time for the various branches of industry to concentrate their whole efforts on getting a SQUARE DEAL as well as a New Deal. Industry knows best who is, and who is not, abusing open-price selling. Let it clean its own house so far as possible. Industry includes as many consumers as producers.

INDUSTRY also must show that the child-like faith of the Brain Trusters, that prices may safely be fixed by Government, but not by Industry, is not based on experience with governments, ancient or modern, autocratic or democratic. The idea that "government can do no wrong, industry must do no wrong," does not make sense.

WE put up with a lot of abuses in any known form of government; we will have to put up with some of the same abuses in a government of industry by industry—because governments are human, and humans are weak. But that does not prove that there are better or safer ways of assuring "the public welfare" than those we are trying; certainly, at least, they deserve a fair trial.

—The Editor

Member A. B. C. (Audit-Bureau of Circulations)
Member A. B. P. (Associated Business Papers)

APRIL 1934

The Oldest Publication In Its Field and the Recognized Authority

Do you know WHAT'S NEW IN CRUSHERS?

THAT crusher you have may be pretty good; but you should see how they build crushers NOW. Crushing practice has been changing rapidly in recent years. There are new machines on the market and you really should know what they're like—whether you are planning to buy or not. Here are three bulletins that will give you all the latest "dope".

Depression years have given Telsmith engineers the chance they had been waiting for—to do a lot of research and to expand Telsmith engineering facilities. They have re-designed Telsmith crushers to work faster . . . crush more rock . . . last longer . . . cost less in upkeep.

How? That and all your other questions are answered in these crusher books . . . with facts and photographs presented in a way you'll like. The three bulletins are —No. C-11 Telsmith Crushers (Primary Breakers and Reduction Crushers); No. Y-11 Telsmith Gyrasphere Crusher; No. Q-11 Telsmith Blue Book (Plant Layouts). And they're yours without cost or obligation. Better write for all three.

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Heavy Duty Trucks

are preferred by those who *Service* them—by those who *Drive* them—by those who *Study* the *Cost Sheets*

GMC Heavy Duty Trucks are *truck-engineered and truck-built*, so as to call for as little shop work as possible. When repairs or adjustments are needed, GMC design and accessibility make them easier and quicker to do.

Drivers like GMC Heavy Duty Trucks because they have a comfortable, *livable*, GMC-built cab. Besides that, they are easy to "take down the road"—to steer—and to stop.

The man at the top, who pays the bills, likes them, because there aren't so many bills to pay.

Don't buy a heavy duty unit until you have our recommendation. That recommendation is based on 30 years of *specialization* in the manufacture and *application* of heavy duty units—of knowing how to *fit the truck to the job.*

GMC Heavy Duty Trucks come in a complete range of types and sizes, 5 to 22 tons, including tractor-trailer combinations.

11 basic models. 6 heavy duty engines—all 6-cylinder, valve-in-head, each developing the highest torque per cubic inch displacement *of any engine of its capacity.* 44 chassis selections. 14 rear axles. 7 transmissions. And all of them *regular, standard GMC heavy duty units.*

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With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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(Issued Monthly)

April, 1934

TABLE OF CONTENTS

Recovery Progress—Trends 25-28

Slackline Cable Excavator Gravel Operation Extended by Clam Shell Dredge 30-32
By R. W. Stone, Pennsylvania Geological Survey

Self-Unloading Crushed Stone Scow 34-35
Developed by Blake Brothers Co., San Francisco, who incidentally find rolls the best equipment for making small-size aggregates. By Edmund Shaw.

All Industry Confers on Codes 36-45
For one week leaders of business and industry get more of the limelight than Congress—Representatives of crushed stone, sand and gravel and slag industries get chance to talk before historic gatherings.

Effect of Different Cooling Conditions on the Quality of Cement Clinker 46-48
By W. R. Chandler, Chief Chemist, Idaho Portland Cement Co., Inkom, Idaho.

Various Rock Products Subjects Discussed by Mining Engineers 56-61
Symposium on silicosis adds much helpful literature. Geophysical methods of prospecting applied to sand and gravel and stone deposits: Santa Cruz high silica cement described.

A Sales Program for the Concrete Products Manufacturer 62-63
Abstract from W. G. Kaiser's address before regional conventions shows widening of market for cement and aggregates in building and modernization.

Fifty-one Cement Plants Win Safety Awards 68-69
Previous records again exceeded in P. C. A. contest. By J. B. John.

Departments

Editorial Comments 33
Chemists' Corner 46-48
Digest of Foreign Literature 49
Financial News and Comment 50-51
Traffic and Transportation 52-53
Hints and Helps for Superintendents 54-55
Cement Products 62-63
New Machinery and Equipment 64-65
The Industry 66-67
Classified Directory of Advertisers 72, 74, 76

INDEX OF ADVERTISERS

A
Allis-Chalmers Mfg. Co... 88
American Manganese Steel Co. 12
American Steel & Wire Co. 71

B
Babcock & Wilcox Co.... 84
Bacon, Earle C., Inc..... 85
Bartlett, C. O., & Snow Co. 85
Binks Mfg. Co..... 83
Blaw-Knox Co. 79
Bucyrus-Erie Co. 15

C
Chain Belt Co..... 16
Chicago Perforating Co.. 84
Classified Advertisements 85-86-87
Classified Directory of Advertisers 72-74-76
Cross Engineering Co.... 81

D
Dixie Machy. Mfg. Co.... 76

E
Eagle Iron Works..... 85
Easton Car & Const. Co.. 82
Ensign-Bickford Co. 77

F
Fairbanks, Morse & Co.. 73
Fate-Root-Heath Co. 5
Flexible Steel Lacing Co.. 80
Frog, Switch & Mfg. Co. 85
Fuller Co. 10

G
Gardner-Denver Co. 78
General Motors Truck Co. 1
Good Roads Machy. Corp. 80
Gruendler Crusher & Pulv. Co. 83
Gulf Refining Co..... 13

H
Harnischfeger Corporation 11
Harrington & King Perforating Co. 84
Hayward Company 84
Hendrick Mfg. Co..... 83

I
Ingersoll-Rand Co. 21

J
Jeffrey Mfg. Co..... 80

K
Knickerbocker Company.. 82
Koehring Co. 8

L
Leschen, A., & Sons Rope Co. .....
.....Inside Back Cover
Lewistown Fdy. & Mach. Co. 84
Link-Belt Co. .....
.....Inside Back Cover

M
Macwhyte Company 3
Manganese Steel Forge Co., Inc. 78
Marion Steam Shovel Company 19
McLanahan & Stone Corp. 83
Morris Machine Works... 85
Morrow Mfg. Co..... 82

N
National Equipt. Corp.... 8
Nordberg Mfg. Co..... 82
Northwest Engineering Co. 87

O
Ohio Power Shovel Co... 6

P
Pennsylvania Crusher Co. 84
Pioneer Gravel Equipt. Mfg. Co. 14
Plymouth Locomotive Works 5
Productive Equip. Corp. .....Back Cover

R
Raymond Bros. Impact Pulv. Co. 24
Robins Conveying Belt Co. 20
Roebling's, John A., Sons Co. 9
Ryerson, Jos. T., & Sons, Inc. 84

S
Sauerman Bros. 85
S K F Industries, Inc..... 4
Smidth, F. L., & Co..... 75
Smith Engineering Works .....Inside Front Cover
Stephens-Adamson Mfg. Co. 69

T
Timken Roller Bearing Co. 70
Traylor Eng. & Mfg. Co.. 7

U
United States Rubber Co. 22-23
Universal Crusher Co.... 83
Universal Vibrating Screen Co.....Inside Back Cover
Used Equipment ...85-86-87

W
Whitcomb Locomotive Co. 81
Wilfley, A. R., & Sons, Inc. 82
Williams Patent Crusher & Pulv. Co..... 79
Williamsport Wire Rope Co. 18
Worthington Pump & Machy. Corp. 17

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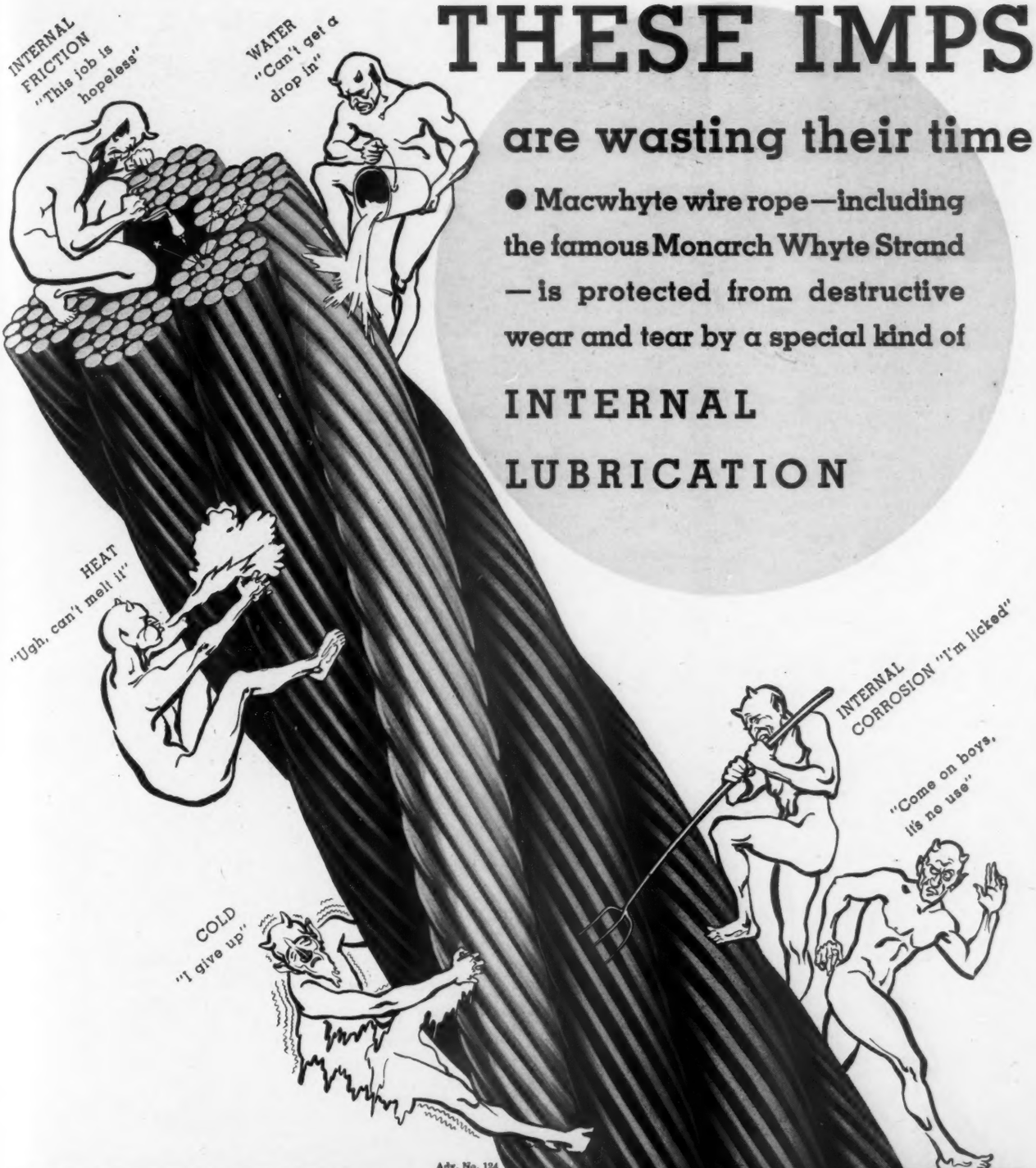
INTERNAL LUBRICATION


INTERNAL FRICTION "This job is hopeless"
WATER "Can't get a drop in"
HEAT "Ugh, can't melt it"
INTERNAL CORROSION "I'm licked"
"Come on boys, it's no use"
COLD "I give up"

Adv. No. 124

A heavy viscous coating of lubricant is applied to each wire in the strand by Macwhyte. It resists heat. Cold does not cake it. Water and ordinary acids do not hurt it. This lasting internal lubrication *plus* unusual toughness of wire *plus* superior Macwhyte workmanship accounts for the service records made everywhere by Macwhyte Wire Rope.

MACWHYTE COMPANY, Kenosha, Wisconsin

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Monarch Whyte Strand gives high performance records
Especially in Preformed Construction

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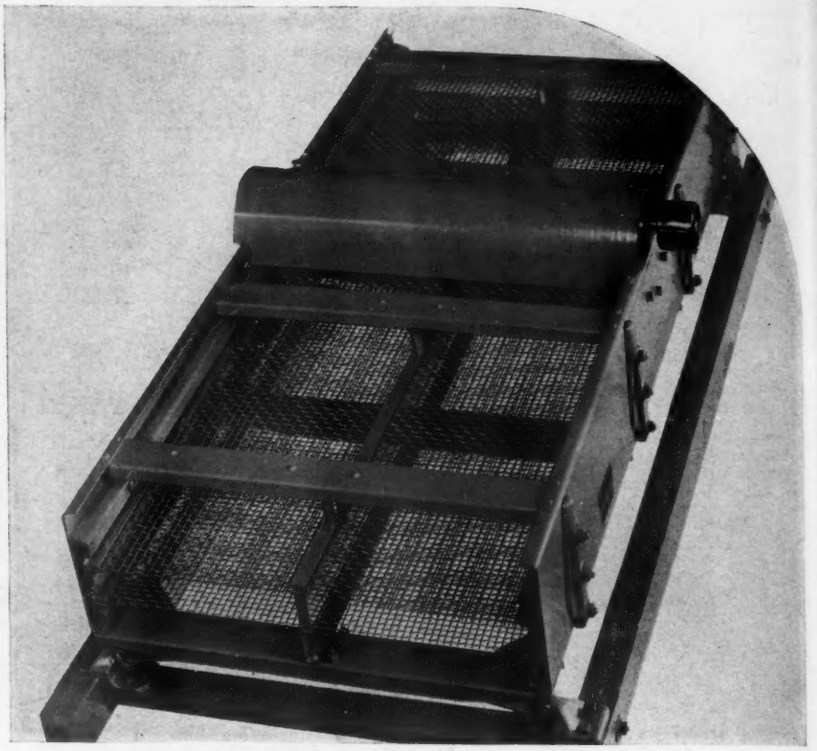


SKF'S MEET DEMANDS OF SCREEN ▼ ▼ ▼ VIBRATION

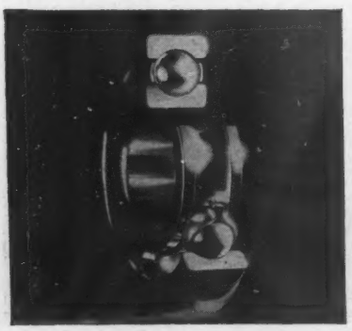
"NO ORDINARY BEARING can stand up under the punishment meted out in the hard service of this SKF-equipped Heavy Duty Type "M" 42″ x 96″ Vibrating Screen," says the Universal Vibrating Screen Company.

There's more truth than poetry in these words, for it takes SKF stamina to meet the demands of steady operation in an abrasive-filled atmosphere. "The design principle of SKF Self-Aligning Bearings apparently makes it possible to make a closer fit between balls and races," they add. "Under the severe vibration our screen frames and shafts are subjected to, if this were not a close fit, the life of the bearing would be greatly reduced."

And when they say, "Vibrating screen service is very hard on bearings, and no *ordinary bearing* will stand up under the punishment," they're citing an application with which all quarry men are familiar. A performance point worth remembering.

3190

● *You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little*



SKF INDUSTRIES, INC., FRONT ST. and ERIE AVE., PHILADELPHIA, PA.

SKF
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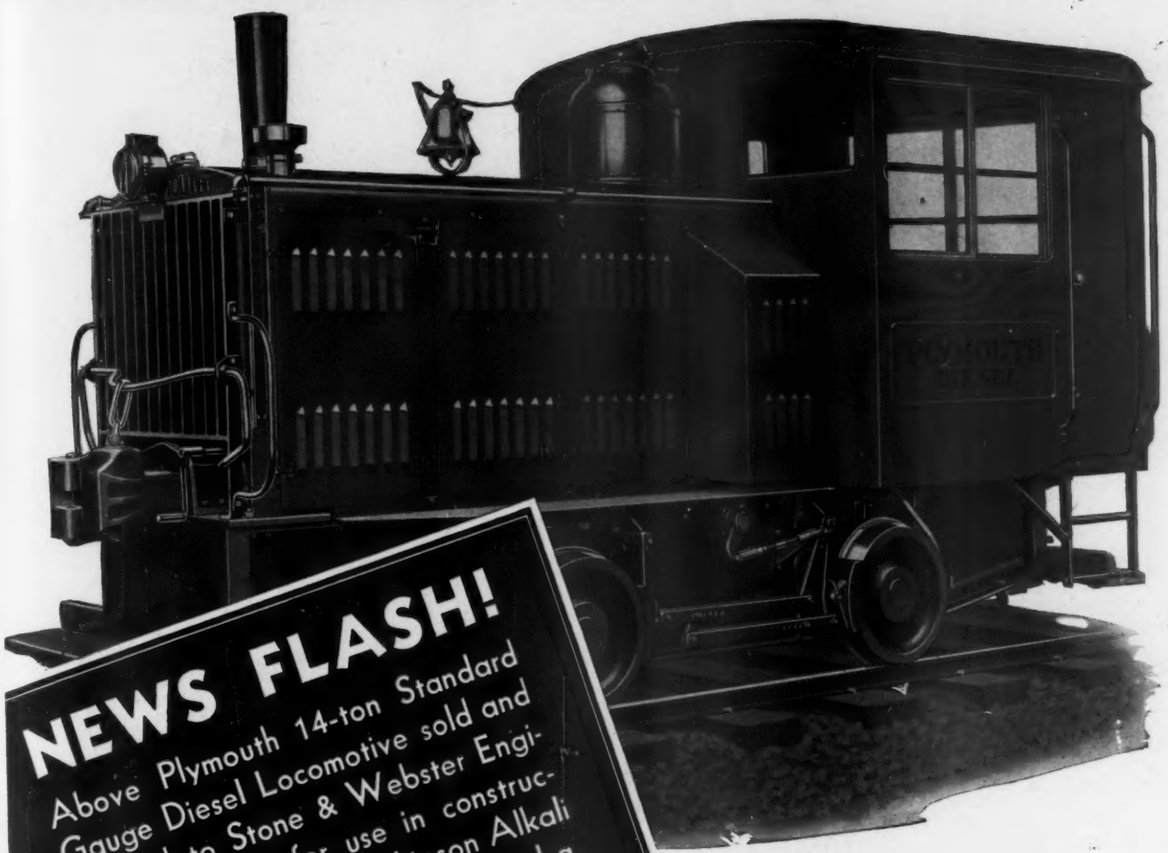
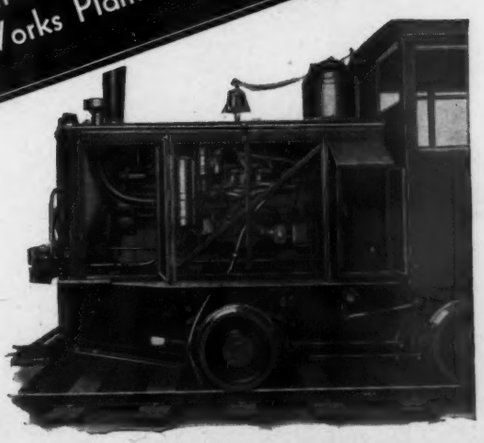
STANDARD GAUGE PLYMOUTH DIESEL



NEWS FLASH!

Above Plymouth 14-ton Standard Gauge Diesel Locomotive sold and shipped to Stone & Webster Engineering Corp., for use in construction of large, new Mathieson Alkali Works Plant at Lake Charles, La.



This new Standard Gauge Plymouth Locomotive literally bristles with important new features which include a strong, durable, welded one-piece steel frame, a rugged, dependable dry-plate type clutch, a heavy duty sliding gear transmission with four speeds forward and reverse, a semi-elliptic cross equalized spring suspension which enables the locomotive to travel smoothly over rough and uneven tracks at full speed without danger of derailment. Made in 12- and 14-ton sizes. Bulletin upon request.

The detailed photograph at the left will give you an idea of what is "under the hood" of the new 14-ton Plymouth Standard Gauge Locomotive. Note simplicity of construction and complete engine accessibility.

PLYMOUTH » GASOLINE GAS ELECTRIC » » DIESEL DIESEL ELECTRIC » **LOCOMOTIVES**

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IS there any wonder that owners of LIMA draglines are enthusiastic about their machines? LIMA advantages are giving them new low figures on operating costs.

Take the drums for instance. Their extra wide face and exceptionally large diameters accommodate maximum cable lengths without double wrapping. This desirable feature plus the advantage of having the drag cable lead off the bottom of the drum to the fairlead (a distance of 7 feet) affords cable economy never before approached on dragline operations.

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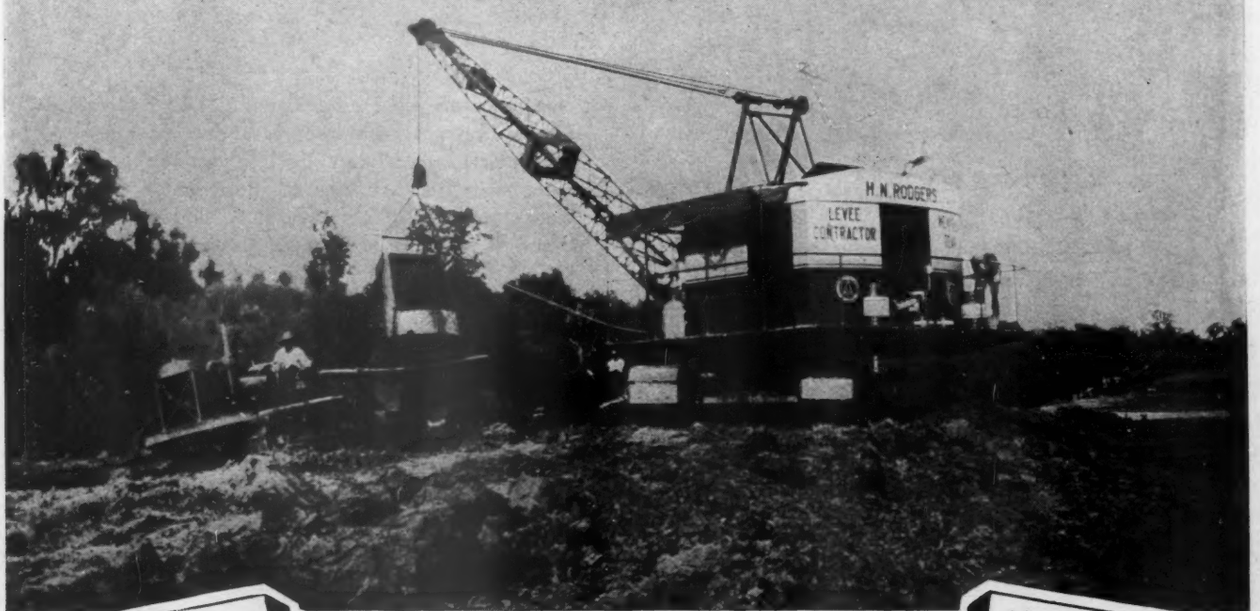

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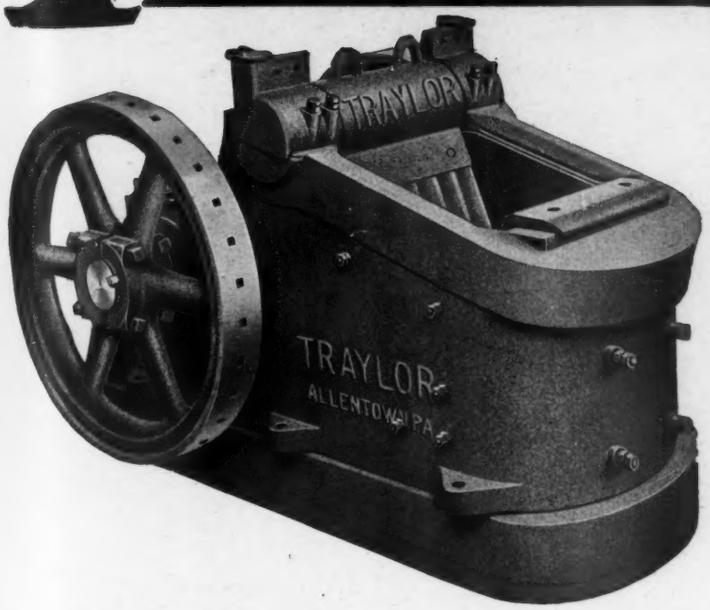

BULLDOG JAW CRUSHER

STANDS THE STRAINS

STEEL BANDS are shrunk around the top and bottom of the rugged, semi-steel frame which absorbs shock and assures stability. The STEEL BANDS withstand the terrific operating strains that develop during crushing and protect the frame against breakage. This design is patented.

On the bottom end of the Pitman, and actuated by the Pitman Shaft, is an exclusive patented punching device that drives through a bar when any dangerous strain develops through packing or other obstructions in the discharge opening.

Crushing action stops INSTANTLY and the machine idles until stopped. To resume operation, you simply remove the obstruction, raise the plunger, slide over the bar and start up again—a matter of minutes.

This safety device plus the patented Rod-Type Pitman with its 3 contact frictionless Toggle System has set a new standard of efficiency in the jaw crusher field. Built 28″x36″ to 60″x84″. Nearly 200 Traylor Bulldogs are now in use in America, the Orient, Canada, South America, Australia—largely 48″x60″ sizes.

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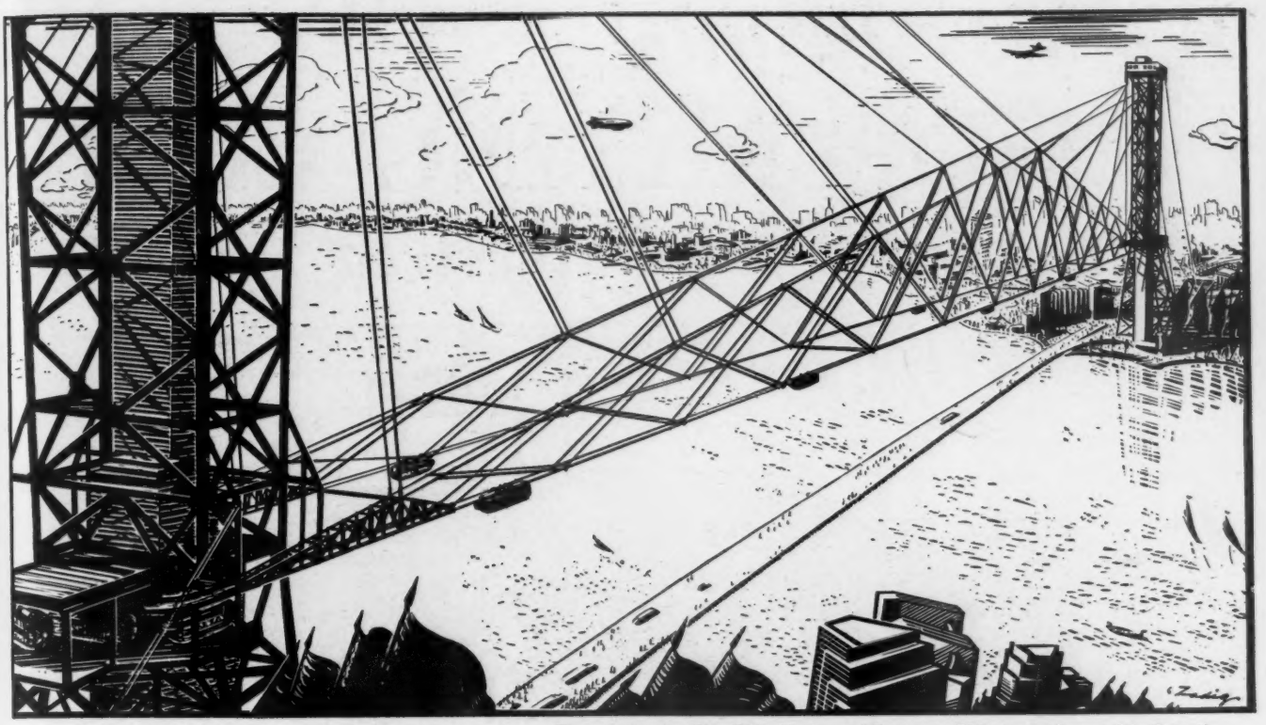

The spectacular Sky Ride, Century of Progress, Chicago, made possible through the development by Roebling of a new engineering principle in cable suspension.

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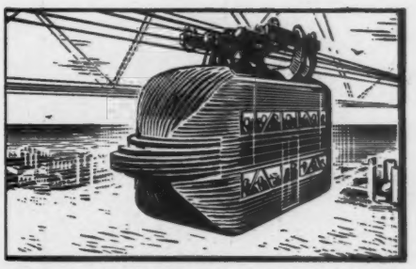
CARRIED SURELY AND SAFELY

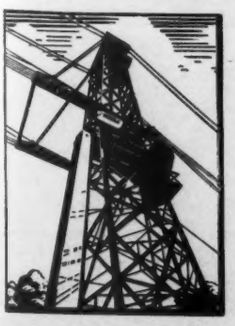
...on the Sky Ride, spectacular Century of Progress feature—suspension system designed and installed by ROEBLING...



One of 10 Sky Ride rocket cars designed by Roebling in collaboration with the Goodyear-Zeppelin Corp.

Did you go to Chicago's Century of Progress? If so, you saw...and probably rode on...the Sky Ride...the modern World's Fair spectacular feature and successor to the once-conspicuous Ferris Wheel.

1½ million people in five months of 1933 were carried surely and safely on the Roebling Cable Suspension System...on cars which traveled a total of 50 to 60 thousand miles.



One of the 628 foot Sky Ride towers, each having four Otis Elevators equipped with Roebling Wire Rope.

Towers are 628 feet high ... over ⅓ of a mile apart... and their Otis Elevators are equipped with Roebling Wire Rope. Span, between towers, is second longest in world. 10 Roebling "rocket" cars—each of 36 passenger capacity—travel 200 feet above ground on Roebling "Sky Ride Track Cable."

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The Pacemaker in Wire Rope Development

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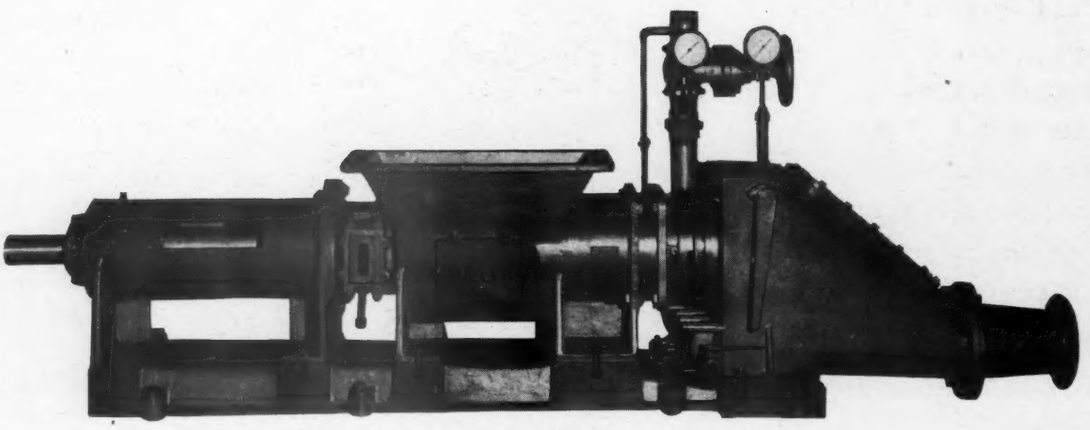
CUT OPERATING COSTS

in Conveying Dry Pulverized Materials



THE NEW TYPE "H" FULLER-KINYON PUMP

"Lowest cost per ton conveyed"

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FELDSPAR
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FULLERS EARTH
GLUTEN FEED
GRAPHITE
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KAOLIN
LIME
LIMESTONE
MANGANESE DIOXIDE
PHOSPHATE ROCK
SODA ASH
SODIUM BICARBONATE
STARCH

Our Engineering Department will gladly furnish estimates for complete systems for any of the above or equivalent materials.

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It retains all of the operating advantages of the Type "F" Pump, introduced nearly two years ago. The material seal is retained, but kept at a minimum density by a movable check valve, thus providing high screw efficiencies and low motor loads. The screw can be removed through an opening in the check valve body, without disturbing the bearings, etc. All important parts are readily accessible for inspection, and this, together with automatic lubrication, insures continuous operation with negligible attention.

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The Evidence Shows

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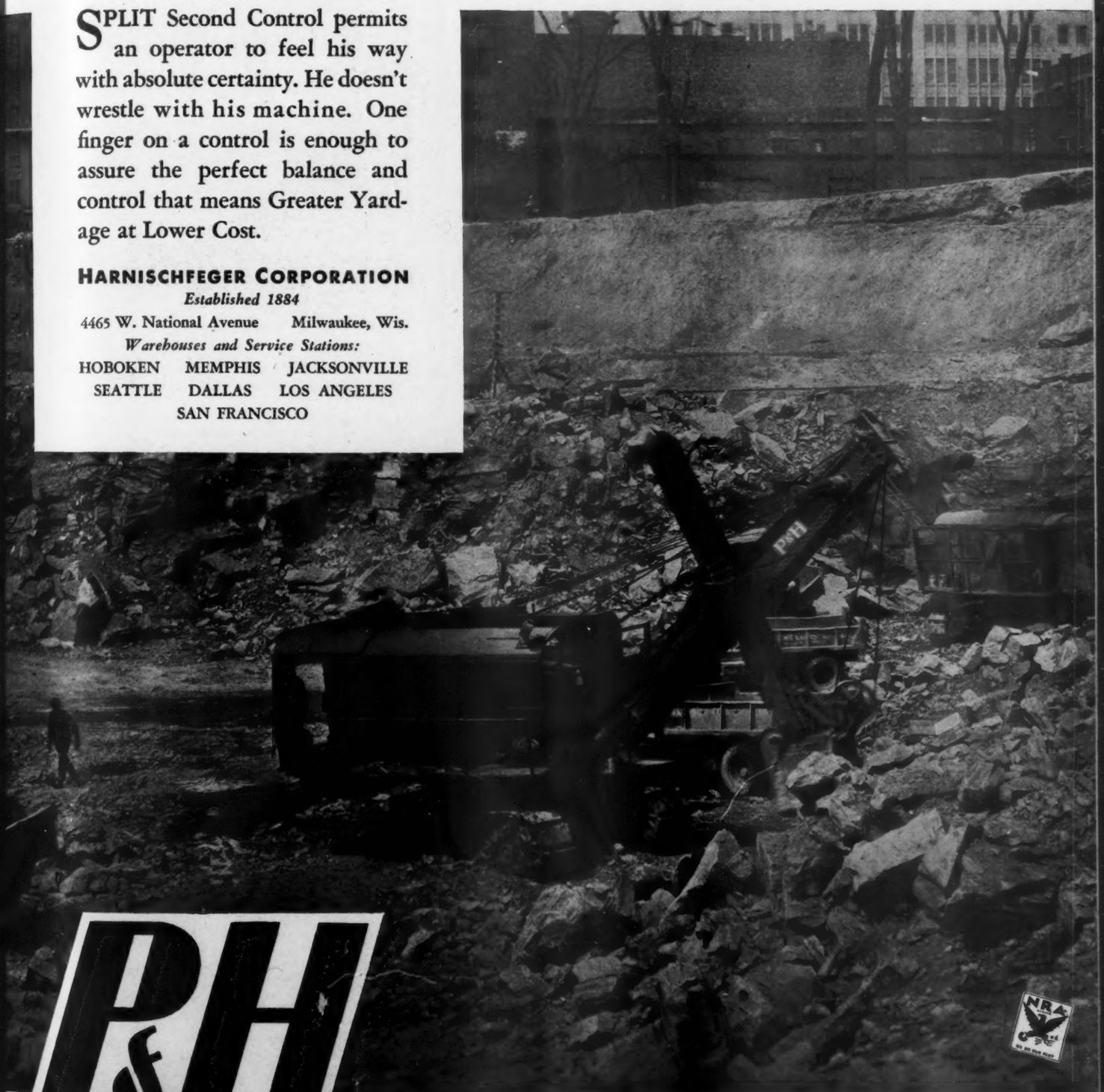

P&H

the 50th year

AMSCO No. 459 WELDING ROD *for Hard-Facing.....*

Industry has learned the value of hard-facing and is rapidly learning the value of using AMSCO No. 459 Hard-Facing Welding Rod for this work.

AMSCO No. 459 Hard-Facing Rod on tests and during five years of field application has proven its superiority by outwearing by 40% other materials costing twice as much. 200% to 300% greater returns on welding rod investment are being made.

Use AMSCO No. 459 Welding Rod on your work. The exclusive characteristics are:

1. Easy to apply with torch—in coated form, with electric arc.
2. Welds with equal facility to manganese or carbon steel and other ferrous metals.
3. Much tougher than other hard-facing materials with comparable abrasion resistance, does not crack, chip or spall off.
4. Being iron base, it fuses readily with iron or steel parts and is better adapted to the work than hard-facing containing no iron.
5. Its qualities of adhesion and toughness are not lessened by heat treating.
6. Presents outstanding resistance to wear and abrasion, even under impact.
7. Costs much less than comparable materials.

Try AMSCO No. 459 Hard-Facing Rod on your next job. Pug Mill Knives, Plow Shares, Dipper Teeth, Drag Chains, Crusher Parts, Tractor and Road Machinery Parts, Screw Conveyors, Pusher Shoes and hundreds of other machine and equipment parts are readily salvaged by hard surfacing with AMSCO No. 459 Welding Rod.

If you have never used it—send for FREE SAMPLE. Use the coupon below

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Sales Offices and Distributors in Principal Cities

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American Manganese Steel Co.,
377 East 14th Street,
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Gentlemen:
Please send us free samples of AMSCO Welding Rods as indicated below:
—AMSCO Nickel Manganese Steel Rod. Size.....
—AMSCO #459 Hard Surfacing Rod. Size.....
—AMSCO Welding Rod Bulletin.
To be used for.....
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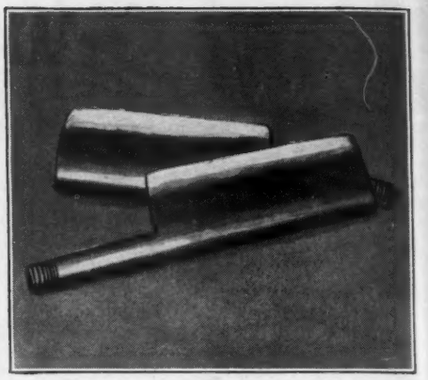
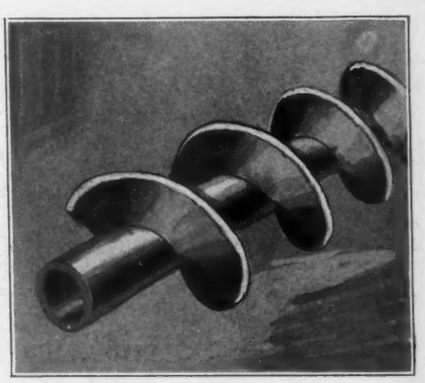
Current characteristics.....
Name.....
Company.....
Address.....

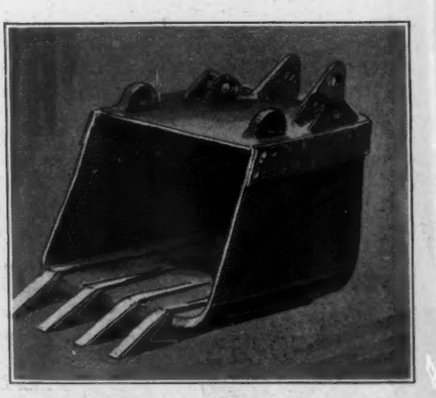


Pug Mill Knives have a vastly extended life when hard-faced with AMSCO No. 459 Rod.

AMSCO No. 459 Welding Rod is ideally applied to pulverizer hammers of every type.



Screw Conveyor Edges, hard-faced with AMSCO No. 459 Welding Rod, many times return their cost.



Hard-faced with AMSCO No. 459 Welding Rod, Dipper Teeth last many times longer.

Now.. THE TOOLS TO CUT YOUR PLANT OPERATING COSTS ARE *at your Command!*

CUT operating costs! That is the answer to the pressing problems of most industrial plants today! Higher fixed costs have forced executives to look for new means and devices for cutting operating expenses and showing profits.

Every plant executive and operating man can now have at his command a new yard stick—*a scientific plan*—which will help him reduce operating and maintenance costs!

Gulf's 7 Point Plan for Industrial Lubrication has been designed to meet the problems encountered in the operation of industrial plants today.

We suggest that you urge every operating official in your organization to become familiar with this cost cutting plan.

GULF INDUSTRIAL LUBRICATION

GULF REFINING COMPANY RP-4
Gulf Building
Pittsburgh, Pa.

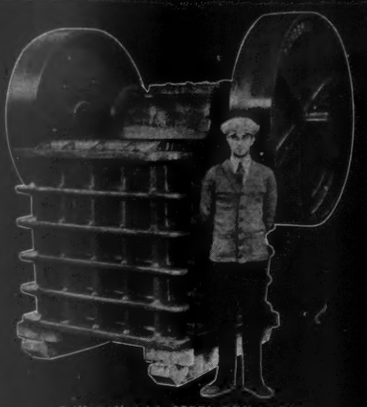
Please send me, without charge, "Gulf's 7 Point Plan for Industrial Lubrication."

Name.....

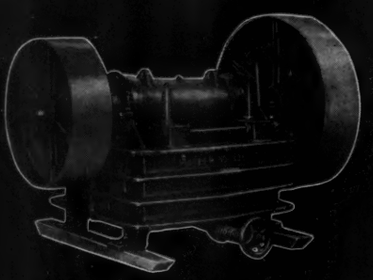
Company.....

Address.....

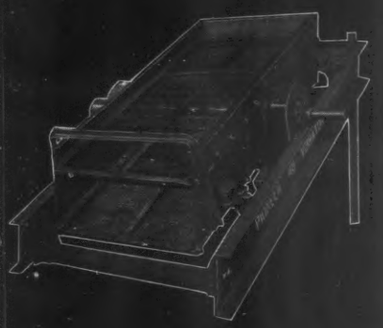
20"x40" ANTI-FRICTION BEARING ROLL CRUSHER
For fast reduction—takes materials up to 4" and reduces by 2" stages. Roll Crushers also made in 14"x24" and 18"x24" sizes.



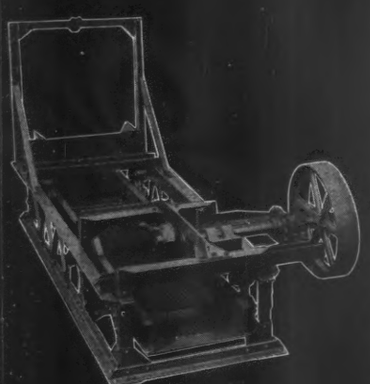
24"x36" ALL STEEL PRIMARY CRUSHER
Force feed lubrication—Overhead Eccentric—Enclosed Worm Gear Adjustment. Maximum discharge opening 6"—minimum 3".



836 ANTI-FRICTION BEARING JAW CRUSHER
Self-aligning SKF Bearings with Patented Dust Proof Closures. Made in following sizes: 818, 824, 836, 1036 and 1536.



No. 48 VIBRATOR SCREEN
Positive drive—anti-friction bearing type. Made in 6 sizes—2'x4' to 4'x8'.



PIONEER SHAKER SCREEN
To meet strict tolerance. Plain or anti-friction types in six sizes.

HEAVY DUTY REVOLVING SCREEN
With Sand Jacket
A complete line of standard and heavy duty revolving screens, may be equipped with Scrubber and—or Sand Jacket.

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Offers You { QUALITY ECONOMY RELIABILITY

IN THEIR COMPLETE LINE OF

ROCK AND GRAVEL EQUIPMENT

CRUSHERS Special features of Pioneer Crushers include a positive adjusting mechanism, enclosed dust proof worm gear, Chrome Nickel heat treated shaft, machined and ground, and dust proof cover over push and pull wedges. The base and pitman are of Carbon Electric Steel, heat treated, with manganese steel jaws.

CONVEYORS Built in four sizes of plain bearing conveyors—16 inch, 18 inch, 24 inch and 30 inch. Anti-friction bearing Conveyors, three sizes—18 inch, 24 inch and 30 inch. Frames are steel lattice type construction offering greatest strength with lightest weight. Also units in plain bearing or antifriction bearings for wood frame conveyors.

SCREENS Vibrator Screens for large capacities on material from No. 3 mesh down to dust are positive action, anti-friction bearing type, with self-aligning SKF bearing dirt proof housings and adjustable screen pan.

Shaker Screens are recommended where close tolerances are required, are equipped with SKF bearings in the crankshaft and hanger assemblies; enclosed water proof and dust proof wrist pins are standard equipment.

Revolving Screens for scalping and washing, are rigid in construction, built in sizes from 30 inch to 48 inch with or without sand jackets or scrubbers.

We have a staff of experienced field engineers who are at your service. May we serve you?

PIONEER GRAVEL EQUIPMENT MANUFACTURING COMPANY

1519 Central Avenue Minneapolis, Minnesota

NEW *full revolving* 3/8 YARD

LIGHT weight . . . 7½ to 8 tons. Traveling speeds to 4¼-miles per hour... climbs better than 30 percent grades. Steers like a tractor through friction clutches. Powerful... 35 to 52 H.P. Great strength... heat-treated alloy steels . . . welded construction. Compact . . . 5′ 7″ tail swing. Dependable . . . automatic lubrication . . . ball and roller bearings at all vital points . . . no center pintle. Tested and proved . . . 3-years of development backed by over 50 years of experience. Speed . . . 5 revolutions per minute with quick acceleration . . . a fast filling, fast dumping, cast-front inserted-tooth dipper. Quickly convertible on the job . . . carries accurate grades . . . economical in price. Balanced value. Send coupon for the 10-B bulletin.

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a multitude of uses . . .

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Company_____
Address_____
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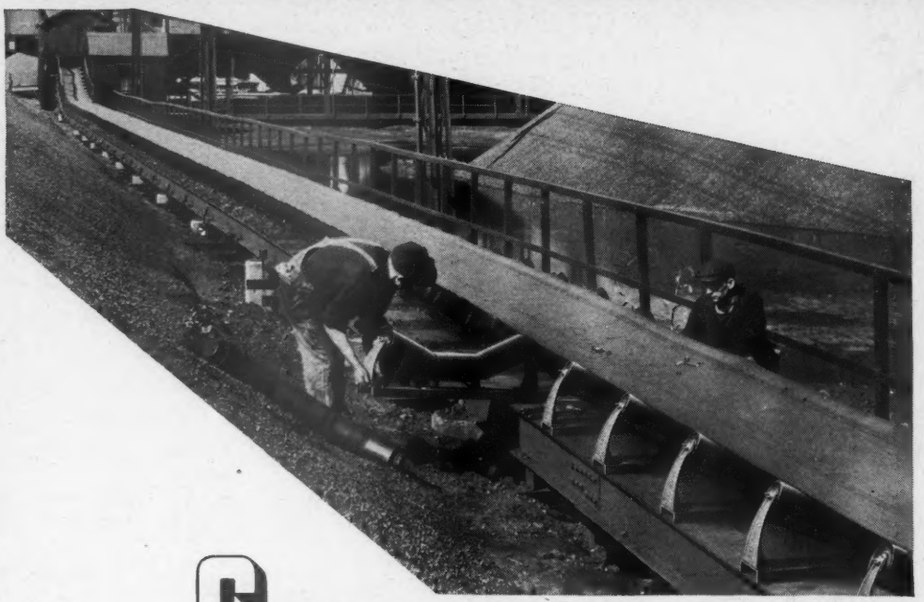
☐ **For file only.** ☐ **Might need a ⅜ yard soon.**

Many new profit-making features . . . tested and proved

CHAIN BELT COMPANY

CHAIN & BELT CONVEYING



Rex–Stearns STANDARDIZING on Timken Idlers

Replacement or plain bearing belt idlers, as they wear, with Rex-Stearns Timken Idlers, is a definite means of lowering handling costs that has become a definite program with many leading sand, gravel, stone and cement plants.

The plant shown in this photograph has, during the past few years, installed over 400 Rex-Stearns Timken Idlers to increase the efficiency of their Conveyors.

Lower power costs, less maintenance labor, lower grease bills, fewer repairs, longer belt life, are all helping to establish lower cost per ton of material handled, as a direct result of this program.

CHAIN BELT COMPANY, 1649 West Bruce St., Milwaukee, Wisconsin. We are interested in the merchandise checked below:

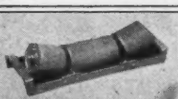
Name_____ Title_____ Firm Name_____

Address_____ City_____ State_____

☐ Rex-Stearns Timken Style No. 37 Troughing Idler.

☐ Rex-Stearns Timken Style No. 38 Picking Belt Idler.

☐ Rex-Stearns Timken Style No. 37 Rubber Covered Idler.



☐ Rex-Stearns Timken Style No. 30 Machinery Application Idler.

☐ Rex-Stearns Style No. 36 Combination Grain Elevator Idler.

☐ Rex-Stearns Timken Style No. 57 Heavy Duty 5-Pulley Troughing Idler.

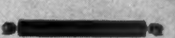
☐ Rex-Stearns Timken Style No. 31 Troughing Idler with Self-Cleaning base.

☐ Rex-Stearns Timken Style No. 39 Tubular Steel Troughing Idler.

☐ Rex-Stearns Timken Style No. 52 5-Pulley Troughing Idler with Self-Cleaning base.

☐ Rex-Stearns Timken Style No. 33 Self-Aligning Idler.

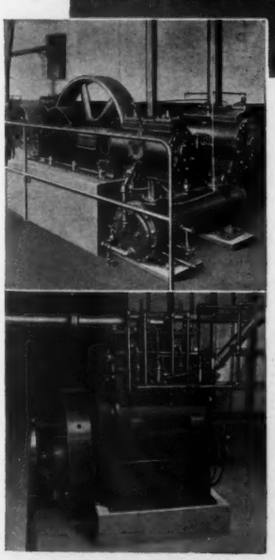
☐ Rex-Stearns Roller Bearing Style No. S-6 Flat Carrying Idler.



☐ Rex-Stearns Roller Bearing Style No. S-1 Return Idler.

(Note): Idlers of types shown above can be furnished with pulley units of Tubular Steel, Grey Iron or Chilled Face Cast Iron construction, depending upon service requirements.

LARGE JOB OR SMALL JOB . . .



EQUIPMENT TO MEET EVERY QUARRY NEED

ROCK DRILLS • COMPRESSORS

A DIESEL OR GAS ENGINE TO DRIVE THE CRUSHING PLANT

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And back of them all... **UNDIVIDED RESPONSIBILITY**

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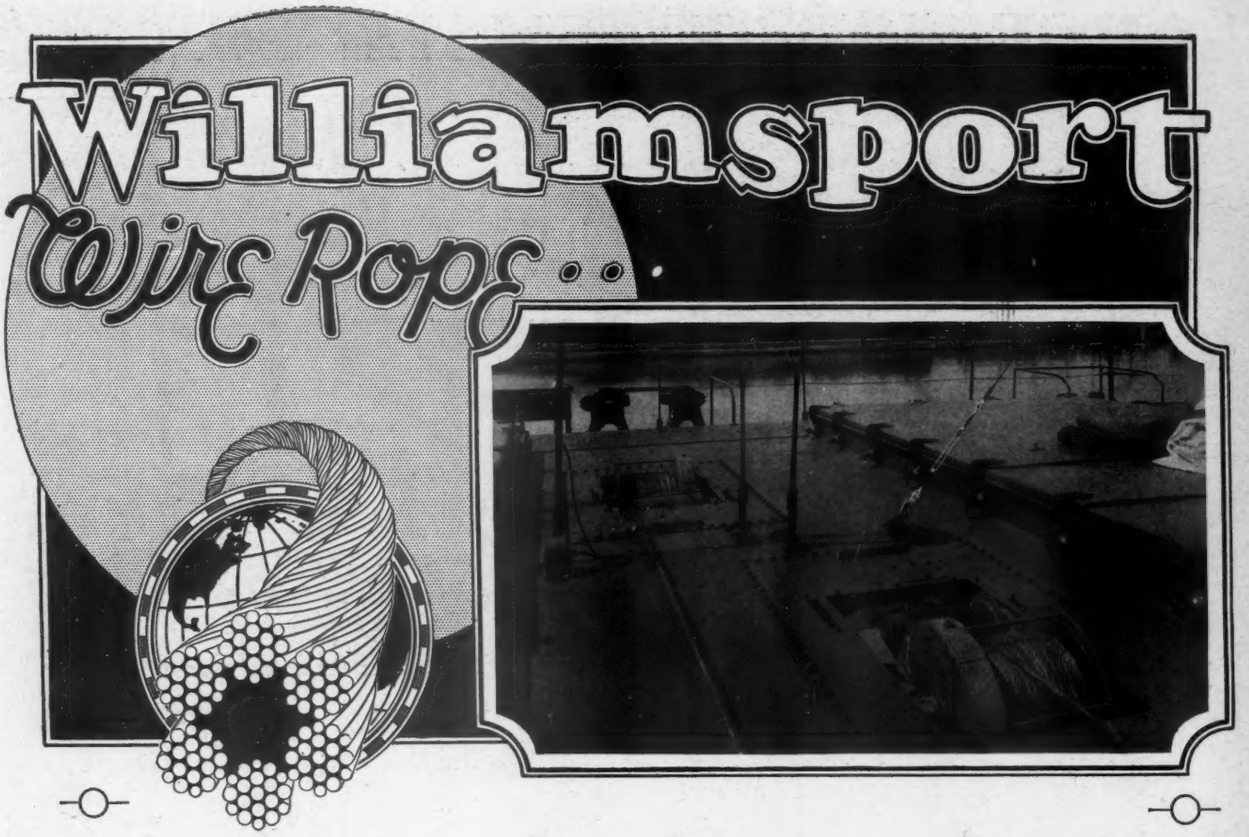
WORTHINGTON



Built Right - *for Lasting Service!*

Regardless of your wire rope problems—Williamsport engineers can be of great help in their solution and you are under no obligation in consulting us. And, too, we are producing wire rope today very much advanced in its development for specific purposes.

There's a specific wire rope for every service and it may pay you to get our advice when you are ready for your next replacement.

We are making "Form-Set"—the newest idea in *Pre*formed wire ropes. If your needs are favorable to the use of *Pre*formed wire ropes—write us.

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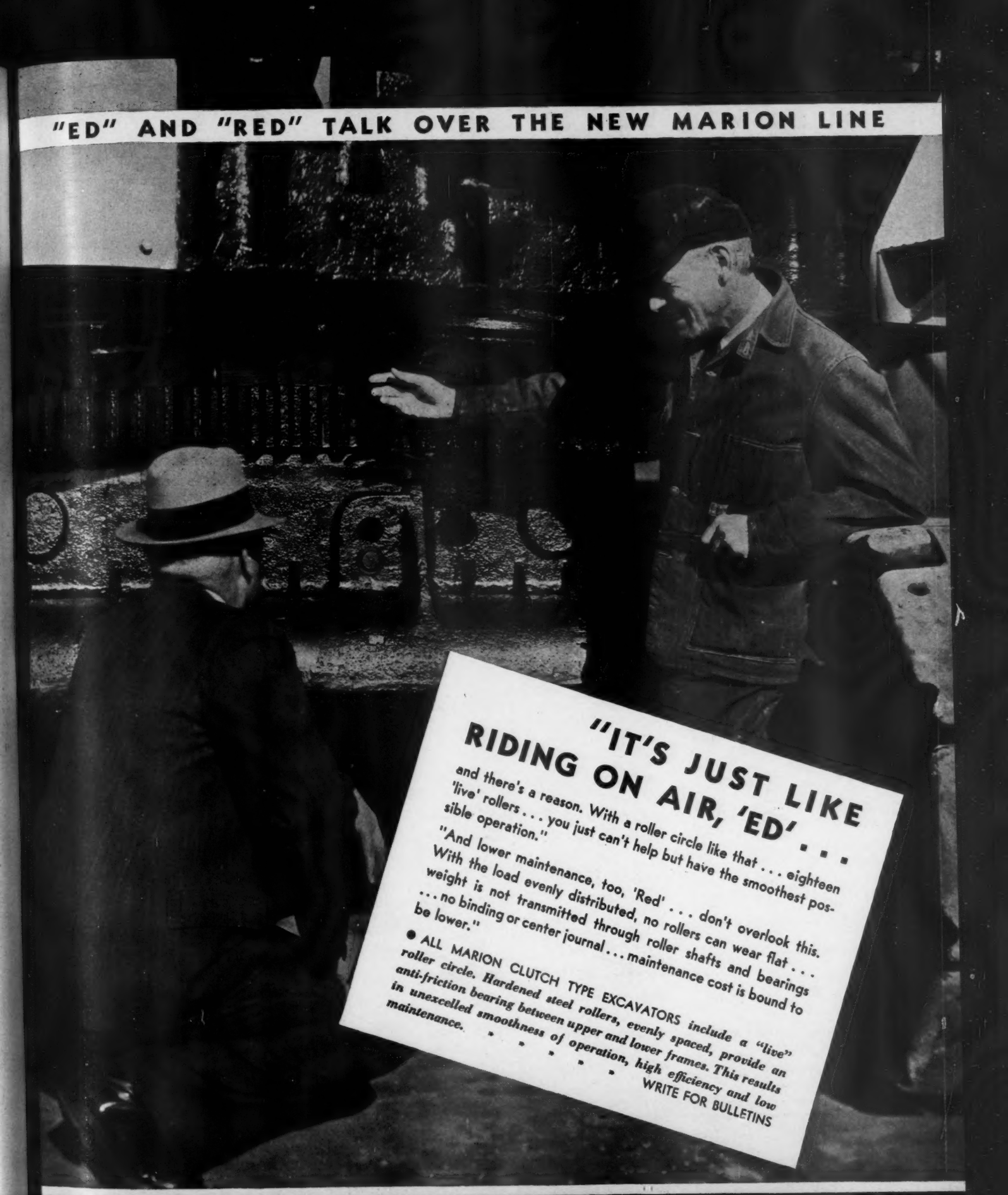

"IT'S JUST LIKE RIDING ON AIR, 'ED' . . .

and there's a reason. With a roller circle like that . . . eighteen 'live' rollers . . . you just can't help but have the smoothest possible operation."

"And lower maintenance, too, 'Red' . . . don't overlook this. With the load evenly distributed, no rollers can wear flat . . . weight is not transmitted through roller shafts and bearings . . . no binding or center journal . . . maintenance cost is bound to be lower."

● ALL MARION CLUTCH TYPE EXCAVATORS *include a "live" roller circle. Hardened steel rollers, evenly spaced, provide an anti-friction bearing between upper and lower frames. This results in unexcelled smoothness of operation, high efficiency and low maintenance.*

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Clutch Drive

Type 340	1 cu. yd.
Type 351	1¼ cu. yd.
Type 361	1½ cu. yd.
Type 371	1¾ cu. yd.

Three Motor Drive

Type 471	1¾ cu. yd.

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Type 5280	¾ to 1¾ cu. yd.
Type 5480	1¾ to 16 cu. yd.
Type 5560	16 to 20 cu. yd.

THE MARION

STEAM SHOVEL CO., MARION, OHIO, U. S. A.

Electric » Gasoline » Diesel » Steam
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Shovel » Clamshell » Dragline » Crane » Trench Shovel

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Two Belt Crawler Class

Type 380	2 cu. yd.
Type 490	2¼ cu. yd.
Type 4101	2½ cu. yd.
Type 5120	3 cu. yd.
Type 5160	4 cu. yd.

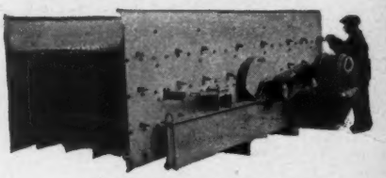
Four Belt Crawler Class

Type 5120	3 cu. yd.
Type 125	3 cu. yd.

DONT LOSE MONEY

trying to produce marketable material

WITH WORN-OUT or OBSOLETE EQUIPMENT



A GYREX SCREEN THAT MAKES SIX PRODUCTS

You know the shortcomings of your plant from experience. A little revamping may mean a lot on your profit and loss account. If you want expert advice on plant improvement, we can give it to you.

ROBINS engineers are skilled in every phase of plant layout and equipment, and we know, too, that like the rest of us you want more than the best layout and a certain type of machinery. You want the best you can get for your money.

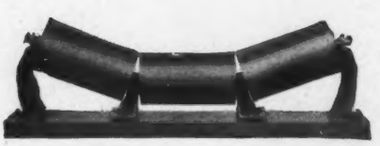
We can't tell the whole story on one page —but we have a way to tell you what you want to know. There is at your service a keen force of trained men, themselves engineers and otherwise having at their fingertips the accumulated knowledge of our 40 years of experience. They will give direct expert treatment to your particular problem.

A FEW ROBINS PRODUCTS ARE SHOWN BELOW. LET US PROVE THERE IS NOTHING BETTER AT ANY PRICE.

THE GYREX with SUPER GYRALOY wire mesh is the most economical screen, because it is properly designed, heavily constructed, has high capacity, universal adaptability and low maintenance cost.

The VIBREX for finer screening is exceptionally popular, because of its low cost, efficient performance and reliability.

ROBINS BELT CONVEYORS with ROBINS BELTS and IDLERS are complete coordinated units. The Idlers have one-shot lubrication, positive seals, automatic adjustment.



ROBINS BIN GATES are sturdy and inexpensive. ROBINS also makes all other types of gates.

WE DESIGN AND BUILD COMPLETE PLANTS FOR CRUSHING, SIZING, STORING RECLAIMING, DISTRIBUTING AND LOADING STONE, GRAVEL, SAND AND SLAG

MATERIAL HANDLING ROBINS EQUIPMENT

ROBINS CONVEYING BELT COMPANY

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Boston Charleston, W. Va. Cleveland Detroit Philadelphia Pittsburgh London Johannesburg

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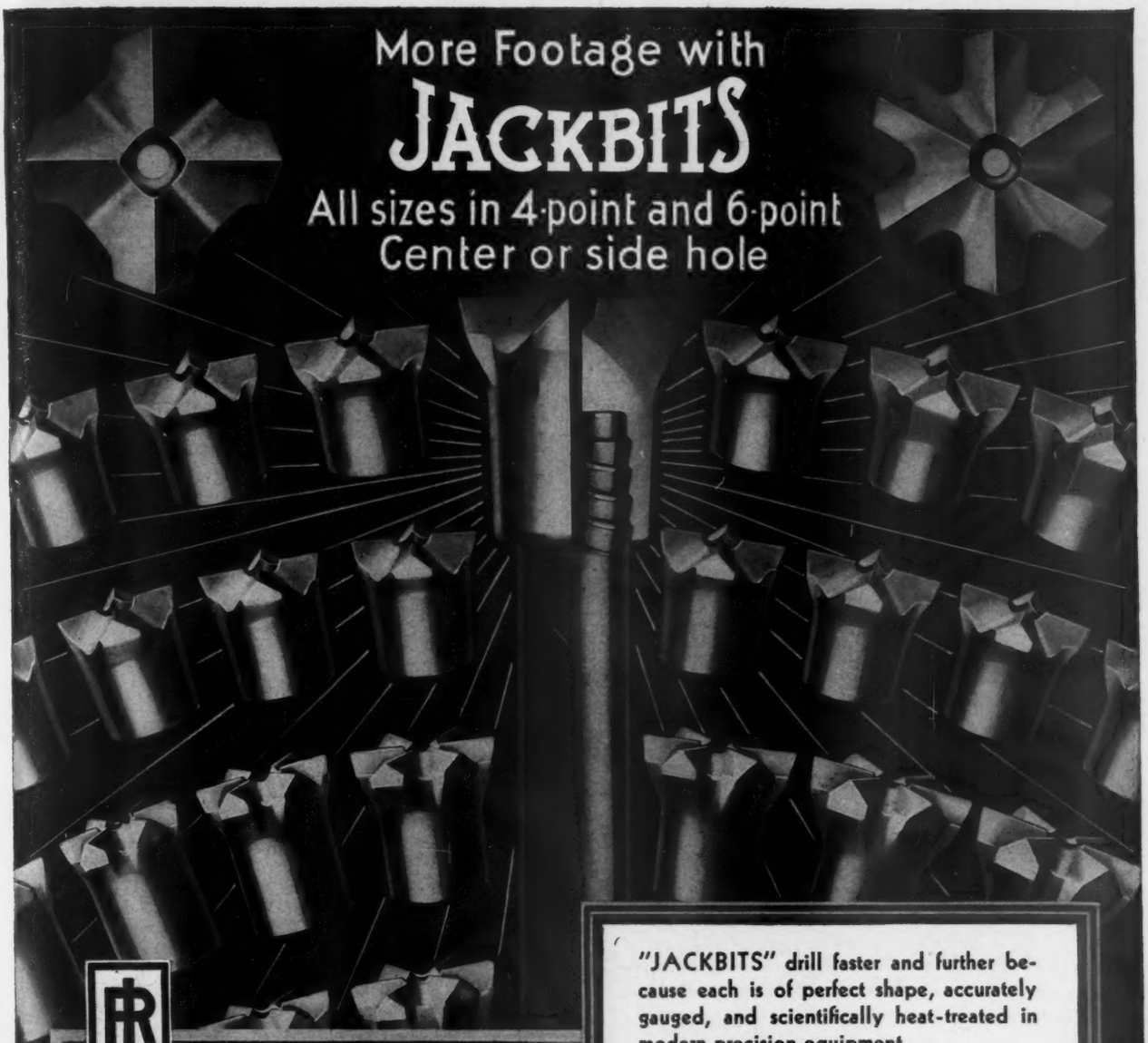
More Footage with

JACKBITS

All sizes in 4-point and 6-point
Center or side hole



"JACKBITS" drill faster and further because each is of perfect shape, accurately gauged, and scientifically heat-treated in modern precision equipment.

They are easily detached even after long use. Can be reground at least twice. Their bright finish prevents rust and keeps them from being lost.

"JACKBIT" Rods are made from materials that are carefully selected and treated to resist fatigue. A smooth, uniform hole is insured by the "super-smooth hole" process.

The "JACKBIT" GRINDER accurately grinds both the cutting face and gauge. A resharpened bit does as much and as rapid drilling as a new bit.

Stock shipment from any I-R branch or dealer

J-2 "Jackbit Grinder"

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World's Largest Producer of
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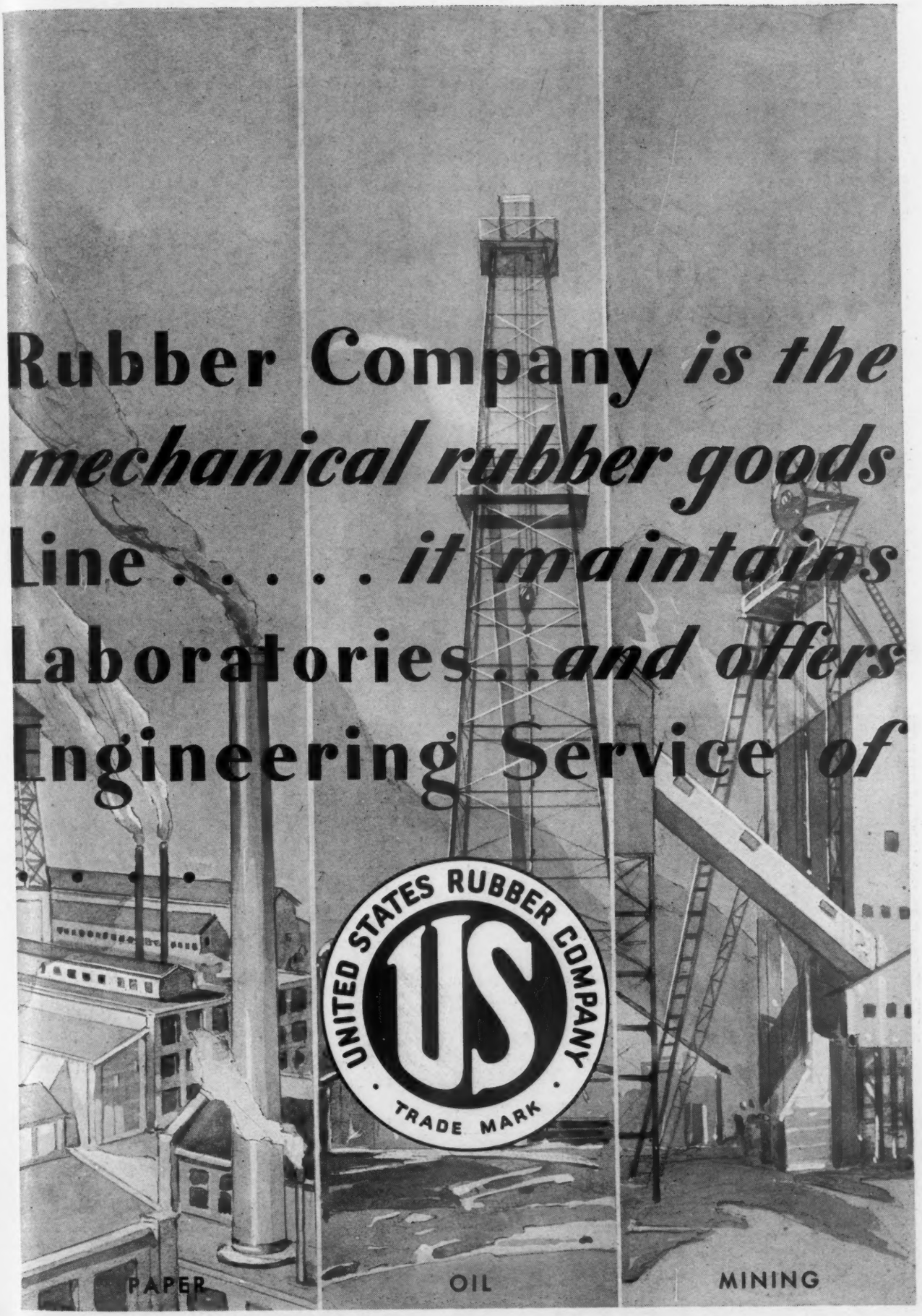
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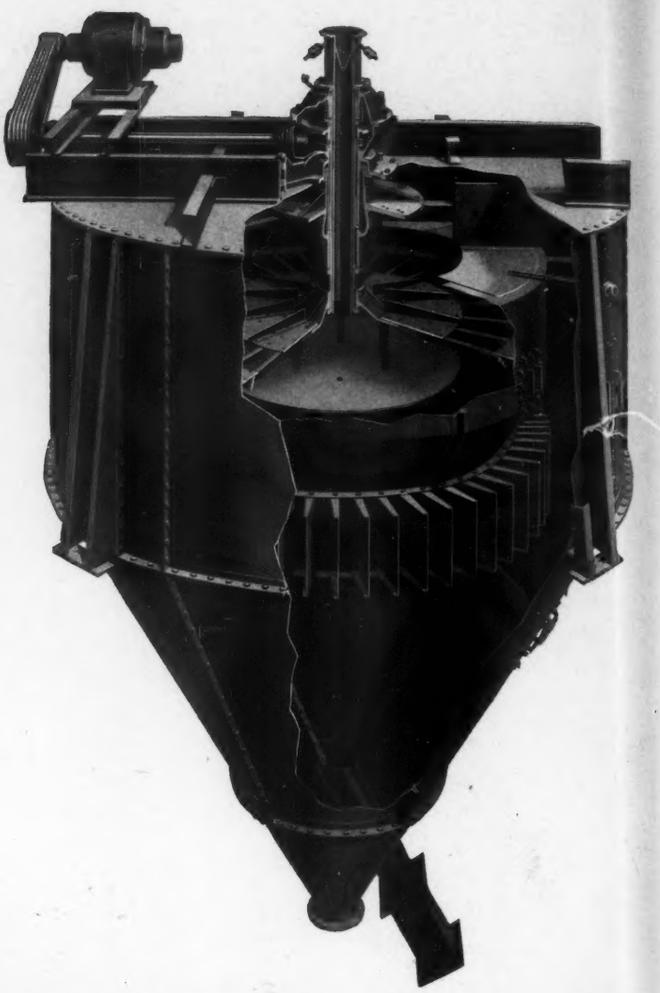
Whizzers

—and Why they are preferred



Two 16-foot Raymond Separators in closed circuit with 3-compartment tube mill classifying raw mix in a modern cement plant.

THE patented WHIZZER in the Raymond Mechanical Air Separator—like the accelerator in an automobile —speeds up the operation!

The rapidly revolving whizzer blades, cutting across the air stream, automatically throw out the coarse particles and prevent oversize from passing through with the finished product.

The result is a more positive separation of the fines, greater uniformity of classification and vastly cleaner tailings. For given diameter of separator, there is a definite increase in output when the whizzer is used.

Progressive plant operators prefer Raymonds because the whizzer feature insures greater production per dollar invested. You buy MORE FOR YOUR MONEY when you install a Raymond Mechanical Air Separator.

Write for catalog, "Handling Materials by Air," which gives actual performance records.

ORIGINATORS OF AIR SEPARATION
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Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVII | Chicago, April, 1934 | Number 4

Recovery Progress—Trends

THE BIG RECOVERY NEWS of the past month, of course, is the report of the Code Authority Conference at Washington, March 5-7, given in considerable detail in the following pages. No producer of rock products can afford not to know this much of what is taking place, for the future of his industry and his own individual business is being definitely shaped by these developments.

Since this code conference, the blast of the Federal Trade Commission at the steel industry, because of its code provisions in regard to open prices seem to be working as planned, the crisis in the labor situation brought on by the automobile manufacturers' interpretation of NIRA labor provisions, and Senator Borah's successful effort to gain political capital by attacking the fundamentals of the NRA, have all together brought about conditions which seem at this moment to seriously jeopardize the whole recovery program.

Federal Court Test of Labor Provisions NIRA

Suit has been filed in the Federal Court at Wilmington, Del., by the U. S. Department of Justice against the Weirton Steel Co. to bring to a head the long-standing dispute over the legal interpretation of Section 7a of NIRA. The real issue is open or closed shop for the steel industry. The Iron and Steel Institute will support the Weirton company. The Government asks for an injunction restraining the company from violating Section 7a and charges that employes were coerced into joining a company union and fired for joining the union affiliated with the American Federation of Labor. Upon the ultimate Supreme Court decision will rest the whole future of NIRA, in the opinion of many observers who have closely watched the federal recovery program.

Must Comply With Codes to Sell the Government

All confusion in regard to the furnishing of construction materials for any work for which federal money is used was cleared up on March 20 by a proclamation by the President of the United States, which requires bidders for Government contracts and contracts financed by Federal funds to sign certificates of compliance with codes. In the absence of codes such certificates showing compliance with the President's Reëmployment Agreement must be produced. A further provision forces contractors making subcontracts to get materials only from those who have certified their compliance with codes or agreed to adhere to the PRA. These provisions apply to all contracts financed by the United States Government, whether federal, state or municipal. Penalty for falsely certifying code compliance is set at a fine of $500 or six months' imprisonment, or both, with the contractor liable for any expense occasioned by cancellation of contracts. Any disputes between the Government agency and a contractor are to be submitted to the National Recovery Administrator or such agency as he shall designate, the decision reached to be final. The order allows specific exceptions in cases where the administrator believes "justice or public interest will best be served thereby."

Big Gun Attacks on NRA

Acting on a resolution introduced in the U. S. Senate by Senator Borah of Idaho, some weeks ago, the Federal Trade Commission has issued its report on the operations of the steel industry under NIRA and its code. This report has been blazoned on the front pages of the newspapers throughout the country, usually with very prejudicial headlines such as "Federal Trade Commission Discloses Abuses of NRA." Whether the character of the newspaper publicity received is caused by lack of sympathy for NRA, or enmity to the bugaboo "steel trust," is not apparent; but the result on NRA's attempts to help industry may be of tremendous importance. The report is an attack on NRA itself, pointing out the direct conflict between it and the Commission, and the laws underlying each.

The Federal Trade Commission concedes that NIRA conceives the possibility of authorizing practices hitherto forbidden by the anti-trust laws, but says that at the same time it sought to restrain promulgation of codes that were designed to promote monopolies or operated to eliminate or oppress or discriminate against small enterprises. The report charges that these practices have been adopted under the steel code. Inasmuch as all operations under

President Roosevelt and Chief NRA Administrator Johnson before Congress of Code Authorities in Washington, D. C., Acme

the code are under the authority of NRA, it is clear the report is in effect an attack on that organization itself. Frequently mentioning the American Iron and Steel Institute, code authority for the industry, the report assails many of its rulings. Inasmuch as two Government representatives from the NRA are members of the code authority, the attacks are taken necessarily to be directed at them as well as at the steel manufacturers. Back of all the attack is probably the ire of old intrenched bureaucrats, aroused by the overshadowing prestige of the new, upstart NRA, manned not by bureaucrats but by business men.

Following fast on the heels of the Federal Trade Commission's news release came what is probably Senator Borah's opening gun in a campaign for the Presidential nomination. He denounced NRA in no uncertain terms as "in the clutches of the monopolists who under cover of codes are fixing prices and sapping the very foundations upon which recovery rests." He attacked the whole theory of restriction of production, that overproduction is a cause of the depression, returning to the familiar "underconsumption" argument.

State Highway Department Refuses to Operate Under Code

The Oregon State Highway Commission has taken the position that operation of its quarries does not come under the Crushed Stone, Sand and Gravel and Slag Industries code of the NRA in view of the fact that "there is no competition with private industry." According to Chairman Scott, the quarries are owned by the state and their product is used for benefit of the public only. In the case where a contractor takes his material from a state quarry, it is the opinion of the commission that the contractor should be regarded as an employe of the state. The industry deserves credit for at least attempting to get the State under the code by invitation.

Construction Industry's Code

The blanket code for the construction industry was approved by the President March 6, and a code for the general contractors' division on March 10. To insure fair competition the General Contractors' Divisional Code, among other regulations, prohibits alternate proposals, unless all bidders have the privilege of submitting them, acceptance of special privileges or favors, revision of a bid after bids have been opened, bidding upon private work upon which bids have already been opened or at any time within 90 days next thereafter (except in the case of substantial changes in plans and specifications). The code requires from bidders prequalification as to capital, organization, experience and equipment. A general contractor must maintain an adequate system of records and accounts to show allocation of funds received or disbursed for specific projects. Funds received by a general contractor for work performed must be applied, first, to paying employes, material men, subcontractors and others. A general contractor shall not give or accept rebates, refunds, allowances, unearned discounts or special services to or from subcontractors, material vendors or others which are not extended under like terms and conditions to or by other subcontractors, material vendors or others of equal credit rating. No financing of a general contractor's accounts by subcontractors or material vendors is permitted, unless such arrangement is expressly provided for in the original contract between the parties.

Doubts About Emergency Feature of Recovery Program

Announcement by Secretary of the Interior Ickes of his proposal to erect a $10,000,000 office building in Washington, D. C., to house his PWA organization makes it appear that construction of federal public works on a grand scale is to be a permanent feature. As it now stands the PWA activities are limited to the two-year emergency declared in the NIRA.

One County Recognizes Hazards to CWA Gravel-Pit Workers

In one county in North Dakota there has appeared a man to look after the safety of CWA workers who has the courage of his convictions, according to local newspapers. He reported that unless conditions were greatly improved he would have to stop the work. He found a place at which workers were tunneling under a top shell of frozen overburden where a cave-in might occur at any moment. "Too many accidents have resulted throughout the state," he said, "to permit this practice to continue." He also suggested equipping workers with first-aid kits.

Bankers' Reactions to Proposed Federal Credit Banks

President Roosevelt's proposal to set up intermediate credit banks and to make loans to small industries was the subject of varied comment in banking circles in Chicago, according to the *Chicago Tribune*. Most bankers who approved the plan admitted that their stand might be prejudiced by selfish interest. The consensus seemed to be that if the banks are set up on a proper banking basis to make only sound loans they won't do any business. On the other hand, if they carry out the aims announced by their sponsors they will help many small business concerns, but will also pile up losses. A number of bankers frankly admitted that they expected the new credit banks, if set up in accordance with the plan announced by the President, to be the means of bailing questionable loans out of commercial banks. "If the Whoozis corporation owes us $10,000 and comes in for a further loan which we are certain cannot be repaid in a short time," said one banker, "we might be unwilling to send good money after bad, but we would have no hesitation about sending the corporation over to the new credit bank to get a loan to bail us both out." Another banker expressed his satisfaction with the plan to have the directorate of the proposed credit banks made up solely of industrialists, omitting bankers from the board entirely. "I couldn't very well turn down a would-be borrower at my own bank and then approve a loan for him as a director of the intermediate credit bank. If, however, I had no direct connection with the board of the intermediate credit bank I need have no hesitation about sending him over to get what he can."

Propose to Make Agricultural Limestone With CWA Men

It must be commercial operators do not have much influence with the Cedar Rapids (Iowa) Chamber of Commerce, for that misguided organization of reputed business men is promoting a scheme to get $500,000 from AAA and CWA to finance application of ground limestone to farm land. A part of the scheme is to use CWA workers in numerous small quarries, leasing stone grinding equipment for the purpose. The local congressman is supposed to be pulling the necessary wires at Washington. It would be absurd enough if a farmers' organization promoted such a scheme, but for business men to do it seems unbelievable. Would they like to have the Government finance and operate all *their* stores and businesses!

CWA Efficiency!

Maybe this is typical of the efficiency of CWA work supervision. At Lena, Wis., CWA workers jacked up a school house, excavated for a foundation. They moved a concrete mixer into the excavation, mixed cement, laid the foundation, removed the jacks, dropped the house on its new base. Then they made a discovery. They had neglected to remove the mixer. It was completely bottled up.

Code Price Data Fills a Ton Truck

An example of what NRA codes mean in the way of statistics and records is illustrated by the mass of data compiled on the competitive question involved in the Chicago territory coal market alone. A fact-finding board is trying to get facts to settle a price controversy between Indiana and Illinois producers. The evidence weighs about a ton and stands approximately 8 ft. high and 5 ft. wide. It is considered the most exhaustive "compendium" of the price and market problem ever collected. The expectation and hope is that the data will bring a definite settlement of the conflict between the Illinois and Indiana operators, in an uproar on prices from the signing of the code, October 2, last, to February 1, 1934, when a truce was declared. Speculating on the time required to review the evidence, it is easy to expect one person could devote at least two entire years to the task without having a moment to spare for anything else. The individual might be at it, too, 16 hours a day out of the 24. If this is a fair sample of the handling of competitive problems under NRA, there should be no dearth of jobs for intelli-

gent white-collar workers as long as NRA lasts!

A Few Administration Inconsistencies

Business men are bewildered. There is a reason. The *Wall Street Journal* (New York City) in a recent editorial listed these glaring inconsistencies:

"(1) Banks are urged to lend freely, so that expanding use of bank credit will stimulate employment and raise basic commodity prices, while the stock exchange control bill threatens a wave of loan liquidation and the NRA proposes sweeping changes in working hours and wages which might well affect the soundness of many commercial loans.

"(2) NRA organizes a committee to galvanize the capital goods industries into life, while the Securities Act is allowed to hamper access to their only source of activity, the investment of private capital.

"(3) Code control of bituminous mining raises the cost of producing coal and necessarily its selling price, while the Government finances new hydroelectric plants which will reduce the consumption of coal.

"(4) The list of farm products under AAA control, to be embraced in a program of scarcity production at scarcity prices, is enlarged, while proposals are brought forward for facilitating our exports.

"(5) A body entitled 'National Labor Board' asserts its right, in the interest of impartiality, to superview elections among plant employes to determine their choice of representatives for collective bargaining, while members of the board openly express their personal commitment to a specific type and identity of labor presentation.

"(6) Devices fashioned to meet an emergency and justified on the ground of desperate need are now described as permanent contributions to the advancement of civilization, subject only to improvement in matters of inconsequential detail."

One Government Bureau Speaks Up for Material Producers

A recent news clip sheet sent out by the U. S. Department of Agriculture (originating presumably with the Bureau of Public Roads) is headed "Why Some Road Jobs Employ More Laborers." It deserves widespread publication:

"Two highways under construction may have working directly at the site of the work very different numbers of men. Yet the job that shows the smaller amount of direct employment, which in most cases is a high type of road, may be furnishing more work to labor indirectly than the other job.

"For example, a road on which the surfacing is of local material with a relatively large amount of earth grading will usually have more men working at the site of the road building operation than a road on which the surfacing is of materials prepared in factories, quarries, or cement mills at other points. But the total of employment of labor for each of the two roads may be practically the same.

"This evident fact was emphasized in the results of a study made by the United States Bureau of Public Roads to determine the amount of money that went to labor employed on highways. It was determined that for a concrete road about 80 or 90% of the money ultimately is paid out as salaries and wages, but only about one-seventh, or approximately 15%, is paid to those employed on the site of the pavement construction.

"Further analysis showed that for a concrete road about one-third is paid to producers of material, another third is paid to railroads and other transportation agencies for the collection and delivery of these materials, and a part of the remaining cost goes to producers of equipment. Labor, in turn, is employed in the producton of materials, in transportation, and in the manufacture of equipment."

Expert Opinion on Outlook for Profits in Cement Industry

The editor of Rock Products is not the only editor familiar with the cement industry who thinks Secretary of the Interior Ickes is needlessly worried about profits to the cement industry from his PWA program. Answering an investor who "was disappointed with the action of cement stocks, particularly Lehigh Portland, in view of the big public works program," one of the editors of the *Wall Street Journal* (New York City) answered thus: "Less than half of the $3,300,000,000 appropriated for public works is being utilized on the type of projects involving cement in their construction. With additions made to the country's already over-extended cement-making capacity in recent years, the industry must await a real revival of private industrial and residential construction before anything substantial in the way of profits will accrue to even the most efficient units. While January cement production was some 28% ahead of a year ago, it still represented only about 17% of the country's mill capacity. Lehigh Portland Cement is one of the larger and more favorably situated units in the trade. It has no funded debt, the only capital liability ranking ahead of the 442,196 common shares being 159,557 shares of $7 cumulative preferred stock. Dividends at the rate of $3.50 a share annually are being paid on the senior issue. The common stock could be regarded as suitable only for an individual prepared to go without returns on his commitment for an extended period."

Iowa Will Have No State NRA Legislation

The Iowa State "National Recovery Act" bill met defeat when the state senate failed to give the measure a constitutional majority, immediately before the legislature adjourned sine die. The vote was 25 for to 23 against. The bill as it passed the house gave the state courts authority to enforce codes.

It certainly must be more than a coincidence that in California, which is one state that has kept up its highway building program throughout the depression, has not diverted gasoline tax or motor vehicle license money, has used up all the Federal money it could get, new car sales for 1933 were 36% better than 1932.

PWA Makes Profit on Municipal Bonds

That the bond market is showing signs of returning life is evidenced in the recent sale of four blocks of municipal bonds by PWA, having a par value of $737,000, at a profit of $20,000. The PWA bought them to help finance local public works. It was claimed the ready sale at premium demonstrated returning strength in the bond market, and that the profit indicated that through future sales, the drain on the national treasury of the public works program may not be as heavy as was anticipated. The PWA has approximately half a billion dollars of municipal securities under contract, all of which have passed close examination. More sales are planned as the Administration actually places the municipals in its portfolio. As everyone familiar with securities knows, the readiness with which the Treasury Department sells Federal Government bonds has nothing to do with the amount of capital or savings available for private investment. The government bonds are sold to banks. The banks can immediately issue currency against them, if they need it. It simply means that the banks are converting temporarily their customers' deposits into a form of deposit that yields a small interest.

Aggregate Industries Open Price Plans to Be Aired

There will be a public hearing in Washington, D. C., April 5, on the open price plans worked out under Article VII, Sections 3 and 4, of the code of fair competition for the crushed stone, sand and gravel, and slag industries, in Districts 1, 2 and 3, Region No. 1 (New England); Districts 1, 2, 3 and 4, Region No. 9 (Illinois and Indiana); Districts 1, 2, 3, 4 and 5, Region No. 13 (Missouri); Districts 1, 2 and 3 (Kansas and Oklahoma); Districts 1, 2, 3 and 4, District 15 (California). The official announcement states: "Because of the effects which such approval will necessarily have upon the crushed stone, sand and gravel, and slag industries, the Administrator has found it necessary to investigate fully the submitted proposals. Such proposed uniform terms of sale and uniform credit practices may, pursuant to the hearing, and/or any subsequent hearings be approved in the form as submitted and/or proposed and/or amended in such form, substance, wording and/or scope by one or more other or similar uniform terms of sale or uniform credit practices, pursuant to information or consideration properly before the Administrator in such hearing, records, conference or otherwise in any reasonable particular germane to the original provisions of such proposed uni-

form terms of sale and uniform credit practices as submitted or as proposed or as modified.

Information Service Available to Aggregate Industry

The Code Authority of the Crushed Stone, Sand and Gravel, and Slag Industries, Munsey Building, Washington, D. C., has begun the publishing of an *Information Bulletin* at frequent intervals to keep producers posted on developments. Two issues had been published up to March 19. The March 19 issue contains a brief report of the code conference.

PWA Construction Will Really Be Going Good Soon

Col. H. W. Waite, deputy administrator of PWA, on returning to Washington after a coast-to-coast survey, early in March, is quoted as reporting that contracts have been sent out covering 1,705 of the 2,186 non-federal allotments made. Throughout the country, Col. Waite declared, there are daily lettings of PWA contracts and universally better understanding of PWA procedure and purpose. He said:

"The peak of the PWA reëmployment should come in the late spring and early summer, according to the best analysis of the field situation. On the basis of engineering, legal and financial prerequisites already fulfilled and building projects already begun, most projects which have received allotments will be under construction as soon as weather permits. They will be completed this summer wherever possible, giving an army of persons now unemployed justified jobs for a considerable period. The ones which cannot be completed this summer are comparatively few."

Col. Waite warned that allotments would be canceled wherever construction could not start in a reasonable time because of local controversy or legal difficulties.

PWA Administrator to Ask for More Highway Funds

Secretary of the Interior Ickes, PWA chief, told newspaper men March 18 that he was considering approval of "general" allotments for highway construction throughout the country, to supplement an original allotment of $400,000,000 to the federal bureau of public roads. Mr. Ickes said there appeared to be sufficient money now to continue road construction to November. Additional funds, he added, may be needed for the program after that date. The peak in highway construction activities under the initial $400,000,000 allotment, it was said, will be reached in August. "Force account work is more expensive," he said. "When someone comes in with a proposal for more force account work it means that they have a political machine or they want to have one." The administrator said he had conferred with President Roosevelt concerning road construction recently, and indicated that the President favored continuation of the program.

Railways Feel Effects of Price Increases

The Association of Railway Executives, through its counsel, Judge R. V. Fletcher, has filed with the administrator of the NRA a statement that the railroads' outlay for materials has been increased at the rate of $126,183,000 annually as a result of code agreements. This figure is based on railroad purchases in 1930. The railroads buy between 20% and 25% of the bituminous coal output, 4% to 5% of the anthracite, 20% of fuel oil, 16% of the timber cut and 20% of the total iron and steel production. The railways' statement found no fault with the program of the Administration, but asserted that they are not in a position to increase their charges because of the rigid federal control to which they are subjected, and hence have no offset to the increase in costs of materials and supplies.

More Rock Products Codes

National Recovery Administrator Hugh S. Johnson, February 28, announced approval of the code of fair competition for the Ready Mixed Concrete Industry. The code fixes a basic maximum work-week of 40 hours and a basic minimum wage of 35c an hour in the South, 45c an hour in the North, 40c an hour in the intermediate area, and 50c an hour in New York City, with a decreasing scale of 5 to 10c an hour in cities ranging from 500,000 population down to 75,000 population, and for cities of less than 75,000 population. About 7,500 persons are employed in the industry.

General Johnson, March 6, approved codes for the Rock and Slag Wool Manufacturing Industry. The code establishes a basic 40-hour work-week, with 48 hours permissible for six weeks in every six months period. Minimum wages for plant employes are fixed at 40c an hour in the North and 35c an hour in the South, with office workers receiving $15 per week. The industry has 885 employes, 75% of whom are benefited by the code labor provisions.

Change Line-up of NRA Code Authority Members

Government members of the Code Authorities of the various industries, representing NRA, will no longer be staff members of NRA. They are army officers of quartermaster and engineer departments, and prominent business men versed in the NIRA. For example, Bernard L. McNulty, chairman of the Trade Relations Committee of the National Lime Association (Code Authority of the Lime Industry), has been made the government representative on the Code Authorities of the Concrete Pipe Industry and the Vitrified Clay Pipe Industry. Army officers are now government members of the Code Authorities of the Lime and the Cement industries, and a civilian government engineer is the member of the Crushed Stone, Sand and Gravel, and Slag Industries' Code Authority.

One Way Federal Money Can Be Spent in a Large Way

It is reported that the Subsistence Homesteads Division of PWA has applications on file to the number of over 2000, aggregating more than 4½ billion dollars of construction work on such new projects. And when the government completes its 4 billion, 400 million dollar mortgage refinancing program, one out of every seven home owners in the country may have the government as his mortgage holder. Of the 14 million families who own the homes they live in, 2,157,000 probably will be in debt to the Home Owners Loan Corporation or to the Farm Credit Administration on their mortgage. Already Uncle Sam, through these two agencies, holds the mortgages on 223,933 city and farm homes, or one out of every 62 homes in the country. And the mortgage refinancing program has barely begun.

Ask State Cooperation to Enforce NIRA

General Hugh S. Johnson, National Recovery Administrator, has asked the governors of 48 states to enact statutes making code violations a breach of state laws; 12 states have already enacted NRA co-operative legislation (Rock Products, December 25, 1933, p. 19).

Smaller Steel Producers Benefit from Code

In spite of the general hullabaloo over the trials and tribulations of small business enterprise, big buyers of steel, like automobile manufacturers, are distributing orders to many smaller producers, where in times past they concentrated orders with the big ones. One reason is that the code of fair competition for the steel industry requires one price to all customers, big and little. Formerly the big consumer was able to get a better price than the little one by placing big orders with big producers. Now the big consumer is sore at the big producer because the practice has changed, and to show his disapproval is patronizing the smaller steel producers. It is obvious, however, that the present advantage of small producer rests on a precarious foundation.

May Establish a Precedent on Price Policy

Divisional code authorities will have power to determine prices in trade areas where destructive price cutting exists under the modified marketing practices provisions of the retail coal code just signed by President Roosevelt. The code requires dealers to post and file with divisional code authorities individual prices, effective on posting, but subject to change at the will of the retailer unless in conflict with other provisions of the code. All changes are to be posted and filed immediately.

Rock Products News Briefs

Crushed Stone

Natural Cleft Stone Industry, which includes rip-rap and rough ashlar—half way between dimension stone and crushed stone—submitted a Code of Fair Competition to the National Recovery Administration, at Washington, D. C., March 17. The proposed code fixes a basic maximum work week of 40 hours with the following exceptions: Emergency maintenance and emergency repair workers, with time and one-third for time in excess of 48 hours a week; managers receiving not less than $35 a week; traveling salesmen; quarry employes 48 hours a week for not more than ten weeks in any six months' period to make up for time lost due to inclement weather. A minimum wage of 35c an hour is provided, except in Tennessee, where the minimum rate is 30c an hour.

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Ohio Quarry Operators, in the northwestern and central parts of the state, were given until April 8 to meet wage increase demands of labor union representatives, who met March 18. If the demands are not met by that time, a strike will be called, it was announced. The workers asked a 65c rate for common labor and a $1.25 rate for skilled labor. Local unions represented included Lima, Marion, Sandusky, Marblehead, Maumee Valley, Bettsville, Marble Cliff, Carey and Forest.

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Buffalo Rock Co., Birmingham, Ala., lost a damage suit brought by a woman automobile driver involving over $30,000. The circuit court jury awarded $60,000 for a fractured skull and other injuries claimed when she was forced off the road by one of the company's trucks. The Alabama Supreme Court affirmed the verdict of the lower court, the trial judge of which had reduced the award to $30,000. The costs, interest and penalties make the total about $36,000.

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Pennsylvania Stone Producers' Association meeting at Harrisburg, Penn., February 12, elected S. W. Stauffer, J. E. Baker Co., York, Penn., president; W. W. Duff, Lake Erie Limestone Co., Youngstown, Ohio, vice-president; Paul B. Reinhold, Pittsburgh, Penn., secretary-treasurer. The meeting passed a resolution thanking Fred O. Earnshaw, retiring president, and expressing the sympathy of the association and its wishes for a speedy recovery. Mr. Earnshaw is in Miami Beach, Fla., recuperating from a serious breakdown suffered last January.

◈ ◈ ◈

Astoria Crushed Rock Co., Astoria, Ore., lists more varieties of quarry products for sale than we have seen before: (1) Rock for roads (crushed); (2) for concrete (crushed); (3) for walks (fine crushed); for service stations (fine crushed); (4) for buildings; (5) for walks; (6) for rock gardens; (7) for flat stepping stones; (8) for garden steps; (9) for embankments; (10) for draining ditches; (11) for monuments; (12) for foundation stones.

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Sand and Gravel

Dixie Sand & Gravel Co., Chattanooga, Tenn., will erect a crushing plant to crush gravel to sand.

◈ ◈ ◈

Springer Transfer Co., Albuquerque, N. M., sand and gravel producers, has taken a contract for the El Vado dam of the Middle Rio Grande Conservancy project to excavate and place in the dam 775,000 tons of sand and gravel. The company must maintain a schedule of 3 cu. yd. per min., 21 hours a day for six months. It is proposed to handle the job with 14 motor trucks, using three shifts.

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Statistics of sand and gravel production for 1932 by uses and by states are available in Mineral Market Reports, No. 264, U. S. Bureau of Mines, dated March 2, 1934. Both tonnage and value are given, so that average prices for each classification of material in each state may be readily determined.

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Pacific Rock & Gravel Co., Monrovia, Calif., is a new enterprise of the three Rogers brothers, who were formerly the principals in the Union Rock Co., and its successor, the Consolidated Rock Products Co., Los Angeles, Calif. The new plant represents an investment of $150,000. T. C. Rogers is president. The two brothers associated with him are George A. and Lawrence. All came, originally, from Monrovia. Montague Graham, long associated with the Rogers brothers in their other operations, is sales manager of the new company. The plant is said to be the last word in modern equipment.

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Pacific Coast Aggregates, Inc., San Francisco, Calif., at its annual stockholders' meeting, elected Earl W. Huntley, Paul C. Newell and Donald Meek to the board of directors, succeeding Thomas W. Banks, P. C. Salterbach and R. E. Tremoureux. All officers of the company were reappointed and Donald Meek was named vice-president and general manager.

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Cement

Statistics for the month of February show that the portland cement industry produced 4,168,000 bbl., shipped 2,952,000 bbl. from the mills, and had in stock at the end of the month 20,763,000 bbl. Production showed an increase of 50.1% and shipments an increase of 29.6, as compared with February, 1933. Portland cement stocks at mills were 1.7% lower than a year ago. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 163 plants at the close of February, 1934, and of 165 plants at the close of February, 1933.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	February 1933	1934	Jan. 1934	Dec. 1933	Nov. 1933
The month	13.4	20.2	16.6	15.5	21.2
The 12 mo. ended	27.1	24.4	23.9	23.6	23.9

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Universal Atlas Cement Co., Chicago, Ill., has issued an attractive 10-pp. booklet with 24 natural color reproductions of terrazzo and terrazzo installations. In addition the booklet contains the specifications for terrazzo adopted by the National Terrazzo and Mosaic Association.

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Lehigh Portland Cement Co., Mason City, Iowa, is making extensions and improvements, including electrification of a number of units.

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Santa Cruz Portland Cement Co., Davenport, Calif., will begin immediately construction of ten silos and a packing plant on the Willamette River near Portland, Ore., to be served by water transportation. The estimated cost is $250,000. A similar distributing plant is nearing construction at Stockton, Calif., and others will be built, or are under construction, at San Francisco, Oakland and San Pedro (Los Angeles harbor), Calif., and Honolulu, H. I. It is said the units at San Francisco and Honolulu will not be constructed immediately, but the others will.

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Monolith Portland Cement Co., Los Angeles, Calif.: Stockholders who finance litigation for the benefit of a corporation are entitled to be reimbursed out of money recovered, according to a decision of Superior Court Judge Shinn in the case of Harman J. Hunter and others against Coy Burnett, president of the company. Under Judge Shinn's decision in the case, which was recently tried, the corporation was given judgment against Mr. Burnett for the recovery of money and stock in the amount of approximately $800,000.

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Superior Cement Corp., Superior, Ohio, has acquired from the American Rolling Mills Co. 760 acres of limestone property in Elizabeth and Decatur townships, Lawrence county, in which the plant is located. The limestsone deposit is 15 miles from the cement mill; when production is begun shipments will be made over the D., T. & I. R. R. and the N. & W. R. R. The property contains both limestone and shale. Formerly the plant used slag from the Wellston Iron Furnace Co. The cement company also acquired a dock and warehouse site in Ironton, Ohio, from which distribution to Ohio River points will be made.

Slackline Cable Excavator Gravel Operation Extended By Clam Shell Dredge

By R. W. Stone,*
Pennsylvania Geological Survey

ALTHOUGH Pennsylvania's principal output of sand and gravel is dredged from the Delaware River flood plain between Philadelphia and Trenton, and from the channels of the Ohio, Allegheny and Monongahela rivers in the Pittsburgh district, the greatest reserves of sand and gravel are in the glaciated areas in the northeast and northwest corners of the state. The deposit of glacial material is thin over broad upland areas, but the old valleys are filled with workable deposits. In the northwest part of the state particularly, the deposits in some of the pre-glacial valleys and in the glacial scoured and filled present stream courses are of considerable depth. The broad flood plain of Allegheny River at Warren, Penn., is an instance of this sort.

Oil-Well Drilling Disclosed Deposit

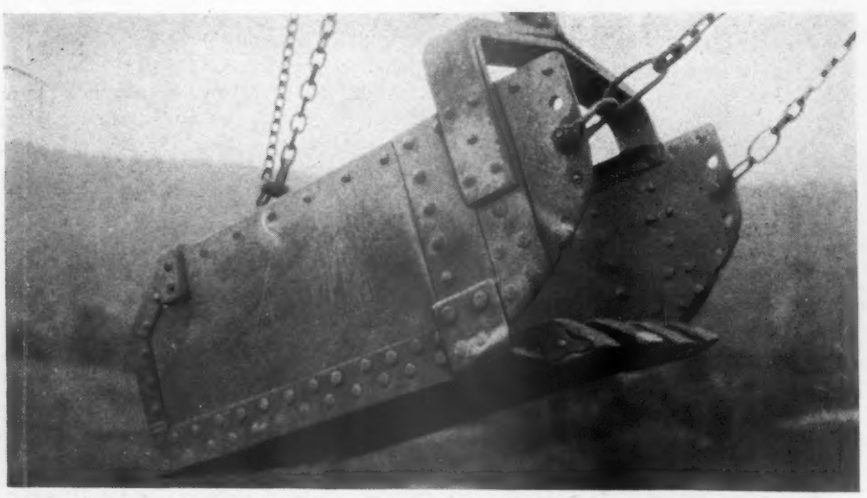
In pre-glacial time the upper part of the present Allegheny River flowed rather directly from Warren across New York into Lake Erie near Dunkirk. The advancing glacier enlarged this valley and, on the retreat of the ice, the glacial streams left the valley filled to a considerable depth with sand and gravel. An oil well sunk on the river flat 3 miles west of Warren passed through 102 ft. of sand and gravel before striking bedrock.

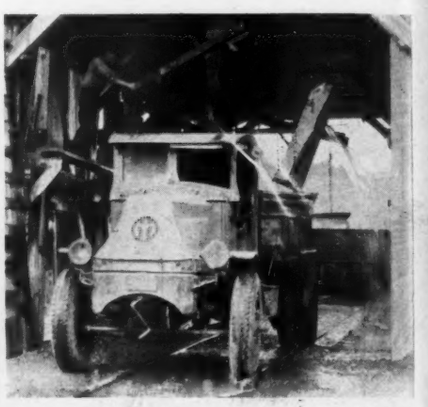
So in 1922 when there was an increased demand for aggregates for concrete in the vicinity of Warren, the General Concrete Products Corp. was organized and bought farm land on the bank of the Allegheny River where the oil well had disclosed a great depth of material.

A screening and washing plant was built directly on the river bank with a 100-ft. mast for a dragline behind it. Fir timbers were used for building this mast, which supports a 1¼-in. steel cable 800 ft. long, anchored on the opposite bank of the river. The Sauerman dragline bucket, of 1-cu. yd. capacity, hangs from a carrier with ball-bearing sheaves. The bucket, which has manganese teeth, dumps on a grizzly of railroad

*Published by permission of George H. Ashley, State Geologist.

Top: Drag line bucket. Center: General Concrete Products Co. plant, Warren, Penn., as seen from stock yard. Below: Two-inch water line spray over bin





Truck loading direct from bin in Pennsylvania plant. Note abundant wash water

F. J. Haggerty, president of General Concrete Products Co., and Richard Van Orsdale, assistant office manager

rails set upside down 8 in. apart. Oversize bowlders are broken with a sledge until they pass the grizzly. Screening is done on a 3-deck Niagara vibrator. The oversize goes to a Climax No. 2½ crusher. If the plant is making large-sized aggregate, everything over 2¾ in. goes to the crusher, and if making smaller size, all over 1¼ in. is crushed.

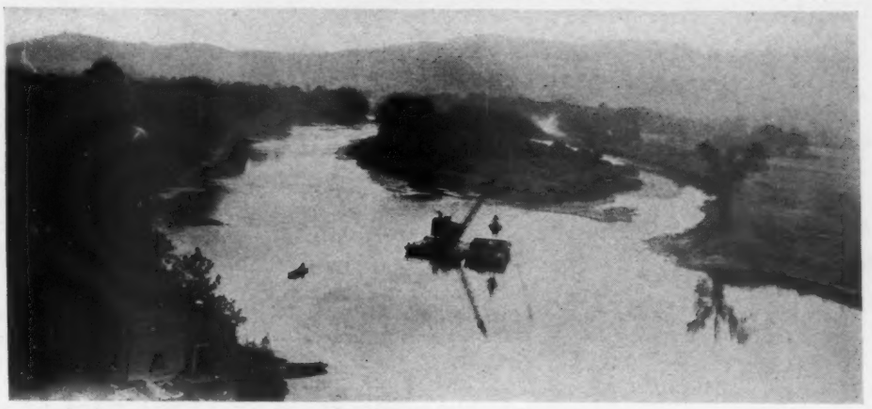
Final Washing Done in Bins

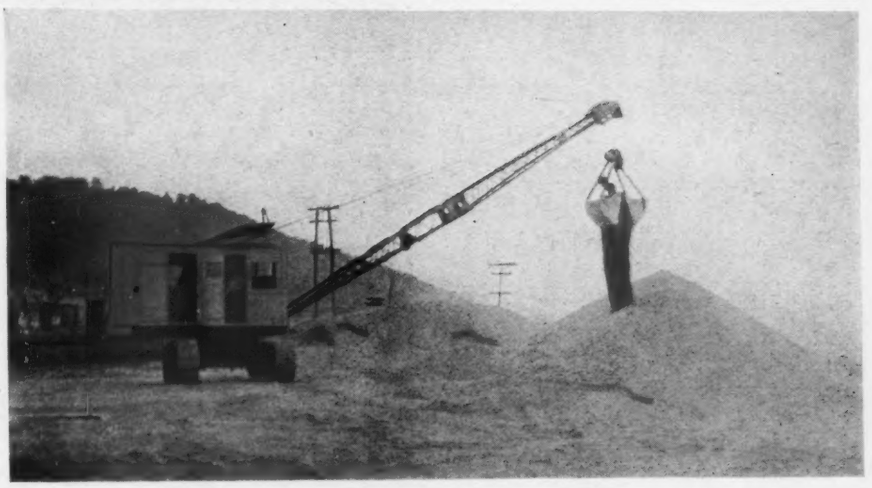
The product is washed while on the Niagara screens and again as it is discharged into the storage bins. Over each of the four bins is a 2-in. pipe ending in a circular spray which effectively washes the contents of the bin. Dirty water from the plant is returned to the river below the plant. As barely 1% of the material going into the plant passes a 100-mesh screen, the quantity of fines discharged into the river in the wash water is not great.

The regular output of the plant is three sizes of gravel and two of sand. No. 1 gravel is a commercial size, ⅜ to 1 in.; No. 2 is state highway department size, ⅜ to 1½ in.; and No. 3 is road gravel and class B concrete, ⅜ to 2¾ in. A coarse sand meeting the state highway department specifications for concrete, and a finer mason's sand are produced. Other sizes of gravel can be made on demand.

Development of Pit Beyond 1000-Ft. Radius

An interesting feature of the General Concrete Products Corp. operation is that the cableway excavator worked for 8 years from one mast location or within a radius of 1000 ft. from the plant. Then it seemed desirable to reach out farther and a rather novel scheme was devised for continuing operation without moving the plant. This was to dredge with a barge, load on a scow, hopper type, and dump the scow in the pit dug by the cableway excavator. This pit, by the way, has been excavated to depths between 65 and 70 ft. and with every high water it is filled with a new supply of sand and gravel.





Top: View of dragline from top of General Concrete Products Co. plant, Warren, Penn. Center: Dredge and scow with glimpse of broad flood plain in which oil well was drilled. Below: Stock piles and yard crane

Washing and screening plant of General Concrete Products Co., Warren, Penn.

A steel barge 60 by 30 by 4½ ft. and a hopper-type scow were built at the plant by Hammond Iron Works, Warren. This barge, named *Tchewa,* from the Indian word meaning "floats like a water bird," has a McMyer clamshell dredge, built by the Industrial-Brown Hoist Co. The barge has five floating compartments, three lengthwise center, and two bulkhead. It was launched with appropriate ceremonies and a picnic May 21, 1932, and the side-dump steel scow 52 by 20 by 6 ft. was launched four weeks later. The scow bears the Indian word *Anokie,* meaning "water rat." Steam power on the floating dredge operates the 1½-yd. clamshell, and also the winch by which the scow is moved by continuous cable from the barge to the dump pit and back. This trip takes barely four minutes, so the dredge loses little digging time while the engineer is operating the winch.

This combination of floating dredge and scow greatly extends the reach of the plant; the dredge can work for years recovering

Vibrating screen and sprays

the deposit that lies within 500 to 1000 ft. beyond the reach of the cableway excavator.

The plant uses all electric power and is equipped with an a.-c. 2-phase transformer. All electric motors were supplied by the Armor Electric Co., Erie, Pa. A 60-hp. motor operates hoist for cableway excavator bucket, a 25-hp. motor, the crusher, and a 20-hp. runs the screens, elevator, and pump. Wash water is raised from the river by a Gould 5-in. suction pump with 4-in. discharge. The pump capacity is 480 g.p.m. The water is raised 18 ft. from the river to plant level, and boosted 75 ft. to the top of the plant. For rinsing gravel from the stock piles in the storage yard 600 ft. of 2-in. line has been installed. This is used for final rinsing of loaded railroad cars.

Six Washings

If we count the lifting by clamshell and draining on the scow as one washing, dumping into the river a second, draining in the cableway excavator bucket a third, washing on the screens a fourth, and by circular spray in the bins a fifth, then the washing of stockpile material in the cars makes six washings before delivery.

Trucks and carload deliveries are made to all towns and projects covering a wide area

A Northwest caterpillar crane, with a Williams ¾-yd. bucket, works between storage piles and railroad cars. Railroad cars and trucks are loaded mostly by direct discharge from the bins in the plant. A 10-hp. electric Armor reversible-motor car puller facilitates handling of the cars. A siding from the Pennsylvania railroad serves the plant.

Plant Testing Laboratory

When cars or trucks are loaded, if the material seems to the eye of the superintendent not to meet specifications, a sample is taken to the laboratory in the office building, dried on an alcohol hotplate, and graded. The laboratory has both New York and Pennsylvania Highway Department regulation screens, and so by frequent checking of the product is able to meet rigid specifications.

The plant has a forge, lathes, oxy-acetylene welding apparatus, and other equipment whereby all ordinary repairs can be made on the ground. Each man who has a fixed station is provided with a small coal stove for his comfort in cool weather. Seven men were employed in the summer of 1932, 3 in the plant, 2 on the barge and scow, and 2 in the yard. F. J. Haggerty, president of the company and manager of the business, has been responsible for the construction of the plant and its development. He is most ably assisted in the office by Richard Van Orsdale, than whom "there isn't his equal in three countries," according to his boss. Such is the feeling between the "big boss" and all his crew, for he says the same of the outside men, makes for efficient operation of the plant and conduct of the business.

The capacity is about 800 tons per day.

When the writer visited the plant September 29, 1933, Mr. Haggerty was on the job but his men were not, the plant having operated the previous week, and stock being ample for the business coming in. During the past season the plant has operated on part time only, just about enough to give the men a living.

Cement

Santa Cruz Portland Cement Co., Davenport, Calif., has acquired temporarily the services of Dr. Fred A. B. Finkeldey, a specialist on high silica cements, of Berlin, Germany, according to local press reports. After a few months' work at Davenport, he is expected to spend his time introducing his product and methods at other American plants.

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Missouri Portland Cement Co., St. Louis, Mo., announces the election of M. Moss Alexander as president. Mr. Alexander will be about the youngest chief executive in the cement industry—38 years old. He was in the flour milling industry for several years before becoming associated with the Oklahoma Portland Cement Co. He joined the Missouri Portland Cement Co. organization on January 1, 1930, becoming in a short time general sales manager, vice-president, and now president.

M. Moss Alexander

◈ ◈ ◈

Georgia Portland Cement Corp., which never got beyond the promotion state, is in the news columns again. The Georgia Supreme Court ruled recently that the acts of "dummy directors" in a corporation shall be treated as the acts of the promoters of the corporation "who will be held liable for any damages caused by false and fraudulent representations made to others to subscribe to stock in the corporation." The case was that of Miss Olivia Harris and Mrs. Sallie T. Steed against the corporation, of Richmond county, and numerous promoters and directors. Miss Harris sought to recover $5,000 which she paid for stock in the corporation and Mrs. Steed asked $2,000, both representing that a "general conspiracy existed" to offer the stock for sale while concealing "illegal promotion fees, various acts of fraud and deliberate mismanagements and certain irregularities in the constitution and liability of the board of directors."

The two women charged gratuitous issuance of large blocks of stock in the company to promoters and directors and alleged that $156,509.71 out of the total proceeds of stock sales amounting to $216,358.54 was spent for promotion expenses. They said such activities of the company and its directors and promoters rendered their stock worthless. They charged further that at the time their stock was bought various promoters and directors of the incorporation had formed a subsidiary corporation known as the Atlantic Lime Rock Corp. "to exploit the only valuable franchise the defendant corporation had" for the benefit of officers, directors and promoters.

The defendants filed demurrers to the petition which the trial court overruled. That action of the trial court was upheld by the Supreme Court. In addition to the corporation itself the defendants were named as H. H. Bell, H. C. Lorick, H. W. Neill, J. C. McAuliffe, D. M. Lyon and L. H. Charvonnier, of Richmond county; W. S. Preetorious, C. W. Skinner, Jr., B. J. Tarbutton, T. I. Harrison, M. Pembroke, C. V. Truit, W. Trox Bankston, Battle Sparks, residents of Georgia, and D. L. Tarjan of Chicago, Ill.

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Ash Grove Lime & Portland Cement Co., Chanute, Kan., is adding 20,000 bbl. storage capacity, according to local news reports.

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Bern, N. C.: Rumors are afloat again, locally, that "capitalists" are planning to build a new cement plant in this locality.

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Vulcanite Portland Cement Co., Alpha, N. J., which has been closed down since November, 1932, is protesting an assessment valuation, for local taxation, of $412,885. The state tax board granted a reduction from $749,400. The company will appeal to the state supreme court. The proposed tax on the unused plant represented about one-fourth the budget of the Borough of Alpha.

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American Federation of Labor is making determined efforts to organize labor in the cement industry, as well as the other big open-shop industries like steel and automobiles. Considerable progress is claimed in the Lehigh Valley district.

Editorial Comments

Self-Confidence of Business Men Is Returning

Various reasons have been advanced for the Conference of Code Authorities at Washington, the week of March 5, depending on what various commentators think of NRA. Some, for example, believe that the NRA had about reached the end of its rope, and without more open, active and vocal support from industry, this noble experiment, like prohibition, was about to collapse. Others think that the President and the Recovery Administrator wanted to impress upon industry that they still wielded a big stick. Still others think that the Administration made an earnest and sincere effort to stir up a little more enthusiasm for real self-government of industry, and thus head off further drastic regulatory action by Congress. The Recovery Administrator's own explanation of the conference was that the time had come to permit those most vitally interested an opportunity "to blow off steam"—and thus presumably prevent an explosion that might be destructive.

Whatever may have been the motive for this and any similar conferences that may be held in the future, one result seems to have been a return of self confidence to business leaders. We have heard and read a lot to the effect that continuance of the depression is caused by lack of confidence—lack of confidence in the future of business, the value of money, the soundness of the recovery measures, etc. We do not recall seeing or hearing emphasized the lack of confidence of business and industrial leaders in themselves. Yet this has been an outstanding factor in prolonging the depression. Business leaders have heard themselves denounced so frequently and so drastically for the conditions which led up to 1929, that they certainly have appeared to lose all confidence in themselves. For a long time they have been nonplused by these moves made to discredit their leadership, to belittle their knowledge of the very fundamentals of business and industry, gained by a lifetime devoted to learning its intricacies.

At the Washington conference they were given an opportunity to reiterate their beliefs, to hear many other business leaders express in public the same views. When General Johnson, the Recovery Administrator, annoyed by the applause that greeted a forceful statement of some of these viewpoints, remarked that they would not settle these problems by handclapping, he may have been wrong, for the handclapping was evidence of the returning self-confidence of these leaders of business and industry, and this return of self-confidence may be the element that turns the trick for recovery. Those who attended certainly must have come away with a feeling that the country still needs their experience, their expert knowledge—their brains—just as much, or more, than it ever did.

Business men who will read carefully at least as much of the proceedings as is published in this issue of Rock Products must be impressed with the fact that the higher-ups in the NRA really want business and industry to show a little more initiative in doing things—in solving problems—for themselves. It seems obvious that the NRA does not want to go on record as certifying to the correctness of every move made, not merely because of the enormous detail involved, but because its strategic position would be far less secure. It is better for it to be in a position later on to call attention to errors or excesses, as they become apparent, than to have countenanced in advance acts which may lead to abuse, or to have denied projected acts for the same reason. It was expressed over and over again, with every evidence of sincerity, that the Government does not want to run your business.

Industry Needs Long Range Point of View

The thing that impressed the editor most at the conference of code authorities was the diametrically opposite points of view of the economic counselors of NRA (presumably a part of the Brain Trust) and of business and industry spokesmen. The economists nearly all presented logical, well-thought-out arguments why restriction of productive facilities would inevitably lead to monopoly and suppression of initiative, why open prices would inevitably lead to uniform prices—prices designed high enough eventually to protect the marginal producer—thus tending to monopoly and suppression of initiative. The business men argued with equal force and clearness that their business, or industry, would never climb out of the present morass without a license to do these very things. Few, if any, business men even discussed the long-range effect of such policies; they certainly did not argue for them as permanent institutions. The economists were plainly trying to establish permanent social and business reforms; the business men were concerned only with the necessity of meeting promptly and decisively a condition, not with arguing the merits of the business or social ethics involved.

Consequently there was no meeting of minds, perhaps little or no appreciation of each other's point of view, for the moment. But, if we are to work ourselves out of this depression and avoid in the future the pitfalls that led us into it, business men must be far more concerned with the social aspects of their acts. They must acquire the ability to view business and industrial problems from the long-range standpoint as well as from the expediency of the moment. The economists are right in that lack of a broader viewpoint is largely responsible for the present woes of business. On the other hand one's point of view can't be very broad when he is in a hole, and most business men right now are in holes. The economists therefore are the ones who should be broad-visioned enough to see that until a business or industry is out of a hole it cannot be expected to see very far ahead. It is easier and fairer for the economists to meet business on its own level today than for business men to meet the economists' level today. The future will take care of itself, if each side is alive to its duty.

Self-Unloading Crushed Stone Scow

Developed by Blake Brothers Co., San Francisco, Who Incidentally Find Rolls the Best Equipment for Making Small-Size Aggregates

By Edmund Shaw,
Contributing Editor, Rock Products

WHILE I was making notes for a story on the Bay Bridge, San Francisco, Stanley M. Hands, the engineer in charge of concrete mix design, called my attention to a barge which was unloading crushed stone at the wharf. "That," he said, "is the cleanest and most satisfactory system of barge unloading that we have here."

The barge was from Blake Bros. Co. quarry near Richmond, which is on San Francisco Bay, and which ships a considerable portion of its production by water. It is one of the older aggregate producing companies near San Francisco, and Edwin T. Blake told me that Rock Products had described his plant and methods some fifteen years ago.

The main features of the self-unloading barge show quite plainly in the photograph. Stability is obtained by giving the hull plenty of beam, so much that one side would have to be well under water before there would be any danger of capsizing. The cargo of crushed stone is carried in a center hopper, which is over a conveyor belt, 20-in. wide and 85 ft. centers. This discharges into the boot of a continuous bucket elevator, with a 26-in. belt, which is carried on a braced frame. This frame is hinged at the bottom, and the top may be raised and lowered by the tackle and A-frame shown.

The lift is sufficient to fill railway cars through a gravity chute, even when the cars are standing on the wharf, which is some 12 ft. above the water. The chute can also put the stone a considerable distance to one side or the other.

Electric power is used and this is supplied by a 45-hp. 4-cylinder vertical gasoline engine of the Holt tractor type. This is connected by a belt to a 20-kw., direct-current Allis-Chalmers generator, 230 to 240 volts. There are two electric motors, one of 20-hp. which is geared to the elevator head pulley and one of 7½-hp. which drives the conveyor and a dipsey winch.

The overall dimensions of the barge are 135 ft. long, 35 ft. beam, 10 ft. sides. Mr. Blake says that it is unusually steady in a sea way.

Deposit and Method of Quarrying

The product is also shipped by rail and by truck, for Richmond is in a lively industrial district. The rock is described as an "indurated sandstone with a silica filler," more like a quartzite than an ordinary sandstone. It is locally called a "hard blue trap," although it is not a trap at all, as the term is generally used. However, the blue quartzite near Little Rock, Ark., and in some other parts of the country is also called trap, so the designation is not unusual. It makes an excellent concrete aggregate, and it is much used for road metal and for railroad ballast.

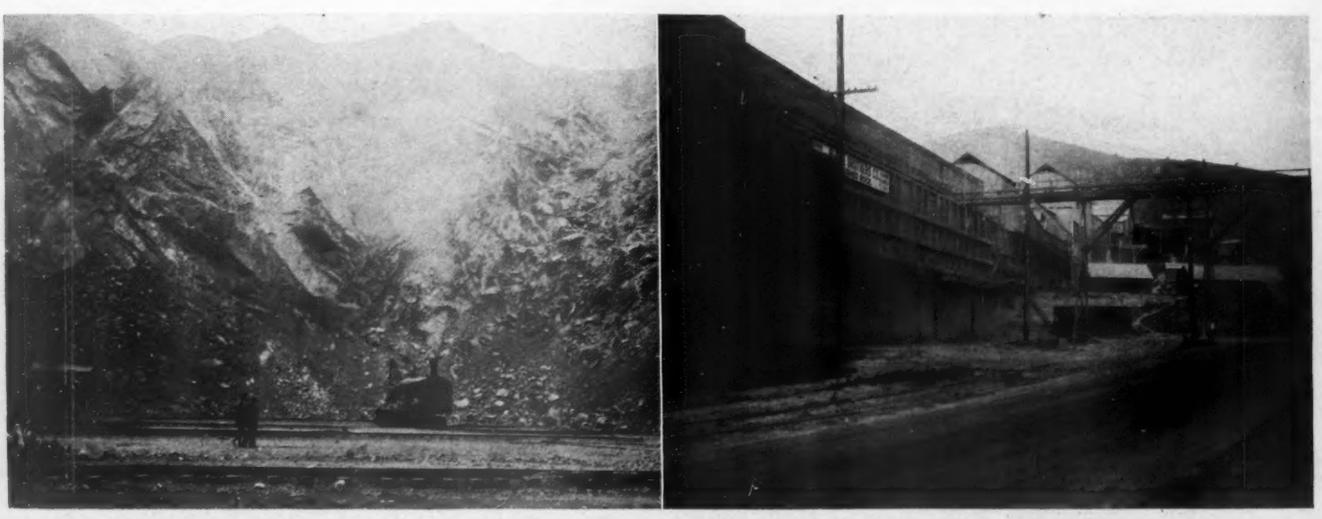
The coyote hole system of blasting, using 10% "Judson R. R. Powder" from the Giant Powder Co., is employed with block holing for the larger pieces. Chicago Pneumatic air-hammer drills are used. The broken rock is loaded into cars by Osgood shovels of 1-cu. yd. capacity, and the cars are drawn in by Whitcomb gasoline locomotives. The quarry has air and water lines running everywhere that they are needed. Oil is used for fuel in the steam shovels and it is brought to the shovels by special tank cars which hold a three-days' supply.

The plant primary crushers are all of the Gates gyratory type and there are two of size 6-K, two of size 4-K, two of size 3-D and one of size 2-D. In addition to the crushers there is a set of Allis-Chalmers rolls, 40-in. diameter and 15-in. face. These recrush 1½-in. material and sometimes ¾-in. material.

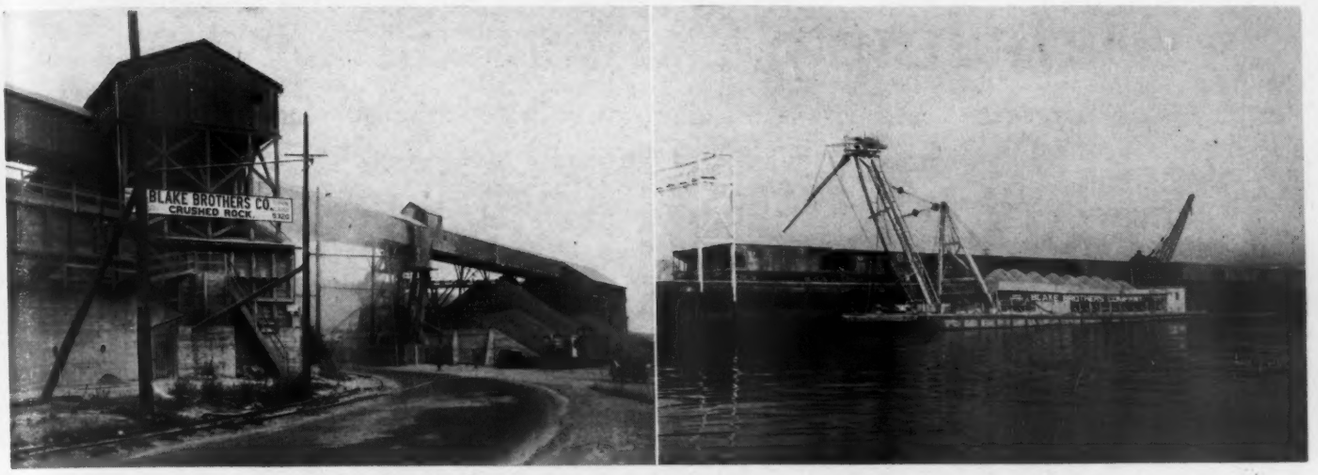
Rolls for Finer Reduction

Being old-fashioned anyway, and a bit of a crank about rolls, I was interested to learn of the excellent results obtained with them in this plant. The superintendent said he believed them to be more efficient than any other form of crusher for the particular work for which they are used. They crush from 50 to 65 tons per hour with a 50-hp. motor and the cost of repairs, supplies and attendance is light.

Extra rolls with shafts and bearings are always ready. When the roll shells need changing, which is about once in two years, these extra rolls and bearings are changed for those carrying the worn out shells, so that the work is interrupted for only a short time. The replacing of the worn shells and rebabbitting of the bearings can be done at any convenient time.



Left: Quarry face on Blake Brothers Co. property near San Francisco, Calif. Coyote hole system of blasting is employed here. Right: Crushing plant



Left: Storage and loading facilities at Blake quarry. Right: Self-unloading barge

The only other work needed is that of cutting off the flanges that form on the edges as the rolls wear down. In the old days this used to mean a good deal of hard work with a cold cutter and a sledge, but now an acetylene torch does the work with less effort and more quickly. The shells are kept true by grinding with emery blocks in the usual way.

The rolls crush in closed circuit with a 40-in. revolving screen, 18 ft. long, and an elevator which has 18-in. buckets and is 40 ft. centers. The height is to give bin room for the finished product.

Roll Comment

A letter to Edwin T. Blake about the use of rolls for crushing in the ordinary crushed stone plant brought the following, which should be interesting as coming from one who has had so much experience besides having a thorough knowledge of the subject:

"In regard to using rolls for crushing fine material, we have found that the practical limit of gyratory crushers is about ½-in. If it is necessary to go finer than this it seems to me that rolls with a fixed distance between them are theoretically and practically the best machine. Like all crushers they have their limitations, however, and when we are feeding 1½-in. rock we do not set them closer than ½-in., and when we are feeding ¾-in. rock we set them down to about ¼-in.

"If you will go back to Weisbach, who is now about 100 years in the past, you can find that reduction crushing is worked out mathematically by him on the basis of reducing two to one in diameter as being the most economical in power and producing the least proportion of slimes or dust. My experience has been that for most materials old Weisbach was just about right. If he had carried his mathematics a little farther he would have been the author of Rittinger's law of crushing, which is now pretty well established as a fact, if you have to pay the power bills."

The Blake Brothers Co. quarry is one of the oldest on the Pacific Coast and has been operated by this company for 27 years. The main office of the company is in the Balboa Building, San Francisco Calif.

Portland Cement Yardage

AWARDS of concrete pavement for February, 1934, are announced by the Portland Cement Association as follows:

	Sq. yd. awarded during February, 1934	Sq. yd. awarded to date, March 3, 1934
Roads	2,355,724	4,486,234
Streets	1,228,386	2,999,166
Alleys	1,870	21,524
Total	3,585,980	7,506,924

Chicago Aggregates Now Quoted Per Ton

EFFECTIVE March 6 all prices on sand, gravel, crushed stone and slag in the Chicago, Ill., district, are quoted in tons instead of cubic yards, as heretofore.

Prices on torpedo sand to dealers, f. o. b., producing plant, range from 30 to 65c; gravel, f. o. b. plant, 40 to 75c; on torpedo sand f. o. b. dock and yards, $1.10; gravel, f. o. b. dock and yards, $1.25.

Prices on mason's sand, to dealers, f. o. b. pit, 40 to 75c; plastering sand, 40c; roofing gravel, 50 to 65c; pea gravel, 20c.

Prices are also quoted f. o. b. team tracks, Chicago switching district, for both one-line and two-line railway hauls, and in various other ways.

Prices to contractors at the pit range about the same as to dealers, f. o. b. docks and yards, the prices are $1.24 for torpedo sand and $1.40 for gravel.

Crushed stone prices to dealers, f. o. b. plant, are $1.00, for screenings 80c, on trucks; in cars, 70 to 80c, for both sizes. Crushed stone to industries, f. o. b. plant, is quoted at $1.44. At docks and yards crushed stone is quoted at $1.54 and screenings at $1.34.

To contractors crushed stone prices at the plant range from $1.00 to $1.25; screenings 90c, in trucks; in railway cars, 70 to 80c; f. o. b. docks and yards, $1.69 for crushed stone and $1.46 for screenings.

Crushed slag prices in general are the same to *both* dealers and contractors, ranging from 40c for bank run materials in less than 500-ton lots (35c for over 5,000-ton lots) to $1.15 for sized material. Other sizes are quoted $1.20 to dealers and $1.35 to contractors.

Publications Received

Control of Ready-Mixed Concrete in Cold Weather—Paper on control of ready-mixed concrete in cold weather presented at the annual convention of the National Ready-Mixed Concrete Association by Miles N. Clair has been reprinted. Extensive data are included in this paper. Thompson and Lichtner Co., Inc., Boston, Mass.

Accident Facts (National Safety Council, Chicago, Ill.). The 1933 edition gives statistics and other data on accidents classified as follows: (1) all; (2) occupational; (3) motor vehicle; (4) home; (5) steam railway; (6) aviation; (7) student. The booklet is of much value, of course, to all interested in safety work, who make speeches and like to quote statistics.

Uses of Coal in the Ceramic Industry (Technical Publication No. 509, American Institute of Mining and Metallurgical Engineers). Prof. H. E. Nold, Ohio State University, Columbus, Ohio, gives analyses of high-volatile coals and other data of interest to all large coal users in such industries as lime and cement.

Highway Fact Series—Series of booklets give comprehensive review of (booklet No. 1.) Why We Can Justify Our Highway Program; (No. 2) Highway and Street Construction as It Relates to Unemployment Relief; (No. 3) Federal Aid for Highways; (No. 4) Gasoline Tax and the Highway Program; and (No. 5) Highway Transportation. American Road Builders' Association, Washington, D. C.

All Industry Confers on Codes

For One Week Leaders of Business and Industry Get More of the Limelight Than Congress—Representatives of Crushed Stone, Sand and Gravel and Slag Industries Get Chance to Talk Before Historic Gatherings

Acme

General view in Constitution Hall, Washington, D. C., on March 5 as code authorities assembled at the call of President

AT LAST the President and the National Recovery Administrator have taken all industry into their confidence to the extent of inviting suggestions from representative leaders on experience with the NRA codes. The conference of code authority members in Washington, D. C., March 5 to 8 was an historic occasion and will be remembered by all who had the good fortune to attend. It was the first opportunity that many of these leaders of industry have had to see the President and General Johnson in action. It was the first opportunity they have had to say frankly and openly what they think about their codes, the NIRA and the NRA. It was the first opportunity they have had to make the headlines of newspapers with these views—the first opportunity the public has had to get them.

How much was really accomplished will not be known for a long time, but industry did succeed in getting the problems of the capital goods industries in the fore front; and industry did drive home the necessity of being consulted more about policies and plans of NRA and the stand of industry at this conference undoubtedly headed off a Presidential decree arbitrarily cutting down hours of labor and increasing rates of wages.

Preparation for Conference

Prior to the conference of code authorities, National Recovery Administrator Johnson held an open quorum for any and all critics, and at these sessions announced a 12-point program for revising existing codes as follows:

(1) A more uniform and equitable rule of price stabilization where necessary to prevent cut-throat competition, with further insurance against prices outstripping purchasing power.

(2) A more effective rule to prevent sales below costs of production.

(3) Uniformity in wages and hours in industries which are competitive.

(4) Uniform classification of areas for the prevailing southern wage differential.

(5) Further reduction in work hours and further increase in hourly wages.

(6) Protection against monopoly, oppression of small enterprise and inclusion in codes of buying regulations to protect the small fellows.

(7) An improved method to secure compliance.

(8) A method for financing code administration without racketeering.

(9) Elimination of inconsistent or conflicting provisions in codes.

(10) Adequate labor and consumer representation in an advisory capacity on code authorities.

(11) Uniform government representation on the authorities.

(12) Wider use within code groups of mechanism for settling labor disputes.

The Administration strategy evidently was to throw out to industry certain aims and purposes—challenges, many newspapers called them—in a series of speeches by the President, General Johnson, Donald Richberg, the Secretary of Labor, and others, carefully avoiding conclusions or flat statements of policy, until the temper and reactions of industry could be determined. These gave industrialists something to think and talk about, and when they were through, General Johnson made the final speech, and started the ball rolling toward getting some concrete results from the conference. These concrete results to date are chiefly the appointment of three committees representing: (1) capital goods industries; (2) consumer goods industries; (3) distribution and service industries. These committees were elected by their respective industries and appointed an official steering committee by NRA. Hitherto all NRA committees and advisors have been hand-picked by NRA and not elected by their industries to officially represent them.

It did not appear to the editor, who attended the opening general session and several of the group sessions later, that there was much meeting of minds between NRA staff members, who had their say at all the sessions, and the leaders of industry who spoke at the group sessions. The NRA economists gave logical and well-thought-out discourses on the general aspects of restrictions on production, open-price policies, etc.—general principles of economics and ethics which no one seemed inclined to dispute; while the representatives of industry confined themselves largely to practical present problems and difficulties which must be faced and overcome in their own businesses, in their own industries. In other words, it was a case of trying to get a mutual understanding between theorists with no business experience but with high motives and ideals, and hard-headed business men who have no time or patience to discuss generalities and theories when faced with pressing, critical, practical problems and conditions demanding action, not debate.

It was obvious from nearly all the speeches of NRA economists, labor representatives, etc., that they have in mind primarily a reformation of all industry and business on broad lines, while the representatives of industry were concerned almost entirely with the present emergency, which calls for prompt decisive action for reasons of expediency rather than long-range applications of certain principles. The obvious confusion in NRA is apparently largely due to the impossibility of reconciling these viewpoints.

General Conferences

The opening conference of the code authorities was attended with all the pomp and ceremony required for a state function. The gathering was impressive, and to all appearances the President was as popular with this group as with all others.

The conference was opened with an invocation by the chaplain of the United States Senate, one paragraph of which, at least, the assembled leaders of discordant industry could well take to heart: "In the face of this great enterprise, O God, may we know that unless Thou art the heart and inspiration of it all, it must fail. Grant our deliberations shall be after the counsel of Thy purpose. Wherever we have been amiss, reform us; where we are in error, direct us; where we are right, confirm us; but enable us to so do our work that every man in his calling may be brought up into the fullness of the stature of manhood which Thou wouldst have."

The President

The address of the President has been published in full in all the newspapers, so it is hardly necessary to quote from it. He reviewed the year since March, 1933, and seemed well satisfied with the progress made. He emphasized the opportunity of industry for self-government; of the primary aim to restore buying power to the people; of the need of public opinion to make the recovery act successful; of the rights of the public, of labor, of the small operator; of the need of credit for business expansion. The point of his address was that business must employ more people and pay more wages.

Mr. Richberg

Donald R. Richberg, general counsel, NIRA, discussed at length the history and philosophy behind the NIRA. He emphasized again and again the opportunity of industry for sane and constructive self-government. As usual, however, he showed a bias which makes it hard to accept him as an impartial philosopher. For example, referring to the period since the World War, he said: "In this last phase of commercialized government the nation's actual governing class had no plan, no object of government, except the use of political power for the protection and aid of their profit-making. They even applauded the sordid statement that 'the business of America is business.' Of course, this policy did not usually stand out naked and unashamed. Even notorious looters of public utilities, banks and natural resources, clothed their greed and dishonesty with blueprints of noble plans to serve the general welfare."

With all due regard to Mr. Richberg's pleasing oratory, and its obvious design to appeal to popular prejudice, one's memory is short who does not recall that in this same period referred to the American people as a whole achieved the greatest material well-being in history and the highest standard of living that anyone ever dreamed of. Also "the blueprints of noble plans to serve the general welfare" were in the majority of instances genuine, and they did serve the general welfare; and not all public utility officers, bankers, and exploiters of natural resources were crooks, by any means.

After such an introduction one certainly has to accept with a grain of salt the sincerity of Mr. Richberg's assurances that: "It must be evident in reviewing the recent developments of our economic system, that we shall find in the future a constant necessity for organization to protect private interests," and his conclusions:

"(1) Business must not be regimented or standardized through the arbitrary imposition of uniform requirements. But on the other hand, there must be laid down, on the basis of private experience analyzed with public impartiality, certain broad rules of fair competition which can be almost universally applied.

"(2) Wages and hours cannot be inflexibly fixed without regard to the varying capacities of trades and industries to utilize labor and to absorb labor costs. But maximum hours and minimum wages must be generally established so as to provide for the absorption of as many workers as possible at the best possible wages, with such further provision for the constant readjustment of working conditions as will permit labor to obtain progressively its fair share of its increased productivity.

"(3) It is theoretically an exercise of individual freedom for employer and employee to agree upon and to maintain employment relations free from outside coercion. But it is a practical necessity for every group of economic interest in modern industrial life to organize itself for self-government and for the protection of its special interests, free from the economic or political coercion of any group of competing interest. Just as the security and freedom of the individual employer may depend wholly upon his ability to join in maintaining a competent and independent trade association, so the freedom and security of the individual worker may depend wholly upon his ability to associate himself with his fellow-workers in an organization for the advancement of their common interest."

Senator Wagner

General Johnson introduced Senator Robert Wagner (New York) as "the author and sponsor of the NIRA, head of the National Labor Board, with whom he (General

Johnson) is ever in complete harmony." Senator Wagner replied by saying "I don't know anybody in the public service for whom I have greater admiration than General Johnson"—which is a typical incident illustrating the bouquets that were passed about among Administration members throughout the sessions.

Most of Senator Wagner's address dealt with the labor provisions of the NIRA; the necessity for coöperation between workers and employers, the freedom of workers to negotiate through representatives of their own choosing, etc. Two paragraphs are quoted to show quite clearly the Utopia toward which the Senator is striving:

"If we intend to achieve the fundamental reforms of the New Deal, we must be careful not to stop short even when wages reach a volume that is sufficient to keep factories open. Under a controlled economy, it would be perfectly possible to balance production and consumption, and still keep workers in poverty. Our efforts should be directed, first toward providing the worker with income sufficient for comfortable living, and then towards assuring him an equitable share in our national wealth. I believe that to accomplish this, there must be considerable change of emphasis in connection with the setting of minimum wages under the codes.

* * * * * *

"It is a mistake to regard the shorter hour movement simply as a means of spreading work, or to criticize it as a lowering of productive efficiency which necessarily would tend to reduce all standards of living. Our technological skill has advanced so greatly during the present century that we can produce more than ever before, even while lightening the burden upon the back of labor. * * * * The shorter week should become a permanent part of our prosperity program. If not, the dead weight of the unemployed will drag us continually into the mire."

Secretary Perkins

Miss Frances Perkins, secretary of labor, quoted many statistics of unemployment, and of reëmployment under the New Deal. The burden of her address was that industry and business must somehow, in some way, find employment for a lot of people still unemployed. The nearest she came to being specific as to how business men were to accomplish this is in the following quotation: "The consumers' goods industries depend upon the purchasing power of the great mass of people who work in the capital goods industries"—which certainly was not news to her listeners, although they were undoubtedly pleased to know that Madame Secretary had at last recognized this undisputable fact.

Pierre du Pont

The chairman of NRA's Industrial Advisory Board, Pierre du Pont, briefly reviewed the setup of the board and its duties, and then outlined the new code authority lineup, which it is important for all to understand:

"After the manning of code preparation, the next procedure was the administration of the codes. The first plan was to divide responsibility by placing a representative of labor, the consumer, and perhaps of other industries, on each code authority. * * * This led to the code authority, being composed of specialists, ceasing to be responsible toward labor and the consumer, because they were especially represented. The new plan is for the code authority to have full responsibility for labor and consumer interests, and the Government (or NRA) representative is in a position to advise the code authority, or to be a watch dog, if needed.

* * * * * *

"The responsibilities of the code authorities are great. You have in the code authority the full responsibility of your industry, supported only by an advisor who has possible veto power of the Government in its exercise of regulations, but the responsibility is primarily upon the code authorities themselves.

"Many small and large problems remain unsolved. These again are largely the responsibility of the code authorities. I refer principally to the small industry and the small industrial unit. They have all the problems of large industries, but they have in addition to that the perplexing question of the survival of the fittest, and what to do with those who are about to go under.

"How far is it possible to save the unfitted? It is a tremendous problem of gravest importance, and it is one before you all.

"I would say the greatest problem before the code authorities, and also before the Industrial Advisory Board, is the question of the integrity of their actions. * * * * Government must preserve its integrity. It must be worthy of the confidence that has been placed in it; otherwise we shall fail. It must be fair to be worthy of confidence. You gentlemen are a part of the Government. You have been delegated a power of government to administer the industry of this country. You also must be fair; you must be honest; you must be worthy of the confidence placed upon you. * * * * With these three factors, which are the basis of all American institutions, we shall win, and there is no doubt that win we shall."

R. E. Flanders

Another member of the National Industrial Advisory Board, R. E. Flanders, spoke chiefly of the PWA and CWA factors in business recovery to date, of the difficulties of getting private employment up to the maximum hours in the codes, of unemployment problems generally. One paragraph was particularly significant:

"We are in danger of forcibly reorganizing our economy to a subsistence basis. What we must do is quite the opposite. We must encourage the growth of the service and luxury occupations, which our civilization can so richly afford. Our thought and planning should then go to better distributing these goods—not preventing their production."

[If salaries and incomes and profits are to be limited to such modest amounts as suggested by the Brain Trusters, it is hard to see who will be left to indulge in luxury services.]

William Green

President of the American Federation of Labor and labor advisor to NRA, William Green is one of the most influential of the New Dealers. His address contained in ten short paragraphs includes 17 "I" (first person pronoun) and about as many more "we." The burden of it was: "I think we have made great progress. I believe the real remedy for unemployment is further shortening of the work day. I am doing all I can to promote the public good." One cannot find a single constructive or even tangible suggestion in what he said.

Dr. Leo Wollman

The chairman of the Labor Advisory Board, Dr. Leo Wollman, gave a very complete and comprehensive picture of status of labor as to wage rates as of 1929 and December, 1933—the effect of the administration of the NIRA on labor. The following is significant:

"There are indeed a fair number of industries in this country whose average hourly earnings have risen above 50% as a result of the labor terms of the codes of fair competition. As more detailed data than are now at hand become available, students of this question will, I am convinced, be amazed at the advance in wage rates which has already taken place under the influence of this novel piece of national labor legislation.

"Upon the inspection of many wage series, I should say something like this: The average hourly earnings of all manufacturing industries probably stood at 60c an hour at the peak of things in 1929. Under the force of the depression they may have descended to as low a point as 40c an hour during the very low of business activity in the early months of 1933. And since the application of the Recovery Act they have made up a large part of their loss and are now close to 55c an hour.

* * * * * *

"I have been through the mill of the Recovery Administration from its very inception, at the beginning of last June. I firmly believe that the advances made by labor in this brief space of time were achieved only through a vast coöperative relation between industry, labor and the Government. Not a fraction of what has been done could have been accomplished by direct legislative fiat or administrative order. As we now stand again at the parting of the ways, the failure to contribute to the solution of the problems of unemployment and of industrial relations is the insuperable obstacle in the path of any program of recovery and of rehabilitation. So far as the problem of unemployment is concerned, it is time for all to realize that

we are probably facing a long-time problem, for the care of which industry, government and labor must begin to devise an elaborate program in which the fixing of hours and wages may turn out to be only one, and perhaps not the most important, of many elements. The handling of industrial relations in its next and imminent phase is perhaps easier. But here there will, I am afraid, be no way to avoid widespread strife, unless men everywhere strip themselves of ancient prejudices, industry recognizes the rights of labor, and labor appreciates the weight of the responsibilities it is now assuming."

Dr. Frank P. Graham

Vice-president, Consumers' Advisory Board, Dr. Frank P. Graham, is a college professor from North Carolina. The Consumers' Advisory Board, of course, is concerned primarily with consumer goods, but some of his remarks are of interest to all producers as the academic viewpoint:

"The talk of free competition, in either the old competitive society or in the later industrialized and more corporate society, protecting the consumer leaves the people cold. They turned away from that talk in a dark time to the NRA with its proposals not for the free competition dominated and degraded by the unrepresentative and unscrupulous chiselers, but with its proposals for fair competition based on minimum wages and maximum hours as the bottom conditions of a decent life to which the fair-minded business men can subscribe without having their throats cut. It is in the mandate of the people's hopes that the NRA must not mean a more powerful manipulation of the unorganized consumers in the interests of the organized producers. With the new powers given the trade associations under the NRA the consumers now look to the code authorities in their work of revision and relief."

[Add to the responsibilities of the code authorities already outlined by Mr. du Pont, elimination of chiselers, payment of higher wages, shorter work days, better quality of goods and service and *lower* prices.]

Clarence Darrow

The chairman of the new Review Advisory Board, to watch out for the interests of small business men, is the well-known iconoclast, Clarence Darrow, once noted criminal lawyer, Chicago. Mr. Darrow's remarks were rather noncommittal—merely that he was there to find out what he could.

Leon Henderson

Director of the Division of Research and Planning, NRA, is Mr. Henderson's job; and he described the work in detail—preparation of statistical and economic reports relative to code industries. He assured his listeners that the transcript and records of the present meetings would be studied and analyzed and made use of by his division. His remarks on the open-price policy are pertinent to all the rock products industries: "It is my firm belief that the actual operations of some of the open price associations exceed the grant of authority conferred by the code and that such operations go far to confuse and destroy the proper ideal of open prices to which every sensible man must subscribe. It is to those sensible and earnest men among you that the NRA must look for guidance in this most vital question."

Mr. Henderson's address was a very thoughtful and constructive description of some of the problems confronting the NRA and how it is proposed to use the accumulation of data and statistics in finding logical and scientific solutions.

Donald R. Richberg

Mr. Richberg made a second address to the final session of all the code authorities on the last day of the meetings in which he summarized some of the impressions he had received during the week. In this address he emphasized the necessity of greater coöperation and coördination between all the industries—something more tangible than the Chamber of Commerce of the United States had been able to demonstrate thus far. He then commented at length on the U. S. Supreme Court decision in the New York State Milk Control Board case—the now famous Nebbia case—in which the Court upheld the established retail price for milk. He gloated over this decision as proof of the constitutionality of NIRA.

Daniel C. Roper

The address of the secretary of commerce, Daniel C. Roper, was largely a defense of the philosophy of the NIRA, with emphasis on the need for business men to grasp its full significance. He spoke particularly of the flexibility of the NRA program to meet new conditions and problems as they arise. The following paragraphs should be read and absorbed by all producers:

"The enforcement of any law under a form of government like ours requires the continuous coöperation of the people. It involves keeping the people informed accurately as to the purposes in mind, and also as to the difficulties encountered in fulfilling the letter as well as the spirit of the law. We cannot proceed in the enforcement of any law without the support of a large portion of the people.

"In such a program leadership is of prime importance, and you men and women here have been selected for this leadership in your respective industries and communities. There must, therefore, flow from you a guiding knowledge and a sympathetic spirit. We must all be patient to hear, slow to reach our final conclusions, where the human element is predominantly concerned, willing to coöperate in working out and alleviating hardship. We must keep in mind at all times that the goal is a well-ballasted industrial program of operations that will recognize all of the human elements involved, including the employer, the employee and the consumer. It therefore seeks a proper balance between industry, agriculture, banking and credit. The program must have supporting it those deeper inspirational and spiritual forces which prompt men and women to think for themselves and sympathetically at the same time for others. It is the overflow of helpfulness and interest that benefits the larger community and the world. The extent, therefore, to which we can give our sympathies and divide them with others will measure largely our usefulness in the world, and, in your cases, will mark the successful code authority.

"There must be kept in mind the fact that those agencies are most effective in bringing results when they are prompted by the initiative of local communities rather than the exclusive reliance on the authority of the Federal Government. You must, therefore, prompt, in the community and in the industries, a willingness on their part to assume and discharge their duties as related to their responsibilities to the community, industry, labor and the consumer. This will and should reduce the governmental interference to the minimum and leave with business the ultimate fulfillment of all obligations which business can and is willing to discharge in the interest of the common good."

Gen. Hugh S. Johnson

National Recovery Administrator Johnson saved his remarks for the final wind-up of the conference. He reviewed the history of recovery measures since March, 1933. Some few extracts follow:

"The National Industrial Recovery Act proposed to maintain the profit system, but, to paraphrase the President, it chose *humanity* first and profits afterward rather than the reverse.

"Certain gentlemen in industry took exception. I do not underestimate their point of view or impugn their motives. I know their problems, from bitter personal experience—just as I know, from bitter personal experience, the destitution and despair of the less fortunate in time of uncontrollable depression. They were not generally men of wealth. They were managers—salaried men responsible to stockholders for profits. That was their first responsibility; before wages, before employment, before national policy—before *anything*.

"They would not accept the moderate provisions of the Recovery Act as it was proposed by Senator Wagner. They got together in Washington hotel rooms. They forgot that 'the old order changeth.' They imagined in their hearts the vain thought that, notwithstanding old faces were gone from the Administration and Capitol Hill—yet old formulae remain. So they began what has been called the Industrial Bonus march on Washington. Like the Bourbons, who 'learned nothing and forgot nothing,' they misjudged the temper of the Congress, which is a mirror for the temper of the American people, and by the incited volume of their protests, they sought to amend the moderate proposals of the Administration and to cut out any conces-

sion except to the managerial side. They were entreated. They were advised that—the more red-fire they burned in the interest of one extreme, the more certain they were to produce a result at the other. They persisted and got exactly what had been prophesied—provisions that made the law more drastic and, like all adversary additions to a well-considered plan, made it more unworkable. I hope we are not going to make that particular mistake again. I don't want to seem in any way threatening, and I know you will not think I so intend, because I honestly believe that you credit me with some understanding of the industrial problem—but there are many reasons why, before any rash decisions, we should continue to counsel together.

* * * * * *

"Economic planning may be as perfect a guide for action as a sheet of piano music, but no harmony will ever reach our ears if there is no keyboard to the piano. Do you realize that we have here—for the first time in history—the keyboard of a complete industrial and commercial system, and upon it we hope you can at least produce economic harmony. The President assembled it to use it for a purpose for which it was created—to improve certain business conditions, national in scope.

"I will say frankly that I have been disappointed. Perhaps I expected too much. I thought you would bring us some plan. I think that there are still possibilities. I believe that, on a plan that I shall later present to you, we will still get results.

"We all want the purpose of this meeting to prevail. We want to prove through this codified organization that industry, acting at the instance and with the participation of government, can produce definite results for the general good. It is something new under the sun, but it is not something in which we are entirely lacking in experience. It is nothing more than the application of the principle of our political system of local self-government to the economic field.

* * * * * *

"Now, my only disappointment about this meeting is that discussion has not been more free. It is not a very satisfactory demonstration that American industry has anything to offer except objection. We have to *plan* our way out of this mudhole, and that must be done by hard-headed business men and not by academicians.

"I gave you twelve points of complaint. It is up to you—and not to us—in the final instance to solve them. The expense and inconvenience and impracticability of doing this in a town meeting is obvious.

* * * * * *

"There are many more things to be discussed: How are we going to make jobs by production and consumption? How are we going to activate the Capital Goods Industries? What more can we do than we have done?

"On this subject we invite your participation in finding a solution for this problem which we have stated so simply. We shall invite a committee selected by you from the capital goods industries to work with the Administration and to report to the President shortly on how we can create jobs in some way other than any yet suggested.

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"We are going to have no super-government of industry. The balance scheme of labor-industry-consumers' representation will be maintained. The goldfish bowl will still be open. Every critic will be invited in the future (as in the past) to come in and tell us how to do it better. Nobody has any occasion to worry as long as he is straight. Industry is intrinsically straight. The essence of the New Deal is public knowledge of methods and results. A man may be entitled to a $100,000 salary from a coporation in which labor, consumers and stockholders are all interested. But he ought not to object to having everybody *know* about it. That is the only bitter pill to swallow. As far as I am concerned I am willing to swallow it. I have made more than that in my time and (with my abundant faith in what is being done here) I'll bet I will make it again.

"But in order to accomplish such blessed events, let's get together—let's pull together—let's play the game."

[All the rock products are classified as capital or durable goods.]

Employment Conference Sessions

Col. R. W. Lee and Edward F. Grady were the assistant administrators in charge. Addresses for the NRA were made by A. J. Hettinger, research and planning division, on the general problem; by William Green, president of the American Federation of Labor, member of the Labor Advisory Board, on the hours of labor. Mr. Hettinger merely gave some statistics of employment in the three branches of industry, service, consumption goods, and capital goods, and pointed out that the problem was largely one of the capital goods industries. Mr. Green merely asked a lot of questions, which he left unanswered, and defended the labor provisions of the NIRA. His only suggestion was: "In any case we must find the money." A later speaker referred to this as "a most noble statement," but he would like to ask Mr. Green "Where may this needed money be secured honestly?"

For the capital goods industries addresses were made by various machinery manufacturers who portrayed their difficulties—most of them spoke against shortening of hours of labor and raising wages under present conditions as destructive to any incentive to buy more capital goods, because the prices of such capital goods at a time when there is little or no demand for them are already too high. As one speaker said: "Let us get the engine well broken in so it can pull a heavier load, rather than undertake the impossible task of overcoming the inertia of the whole economic body." Also, in some industries, there is already a scarcity of skilled labor, and to cut hours further would seriously handicap such industries. Others argued that there should be better compliance with present labor provisions in codes before changes are made. There was also much discussion of wage differentials between North and South.

George S. Houston

Representing the Machinery and Allied Products Industry, president of the Baldwin Locomotive Works, George S. Houston, made some very pertinent remarks, in part as follows:

"In 1929 American business saved, by producing more than it paid out, 2 billion dollars on an 85 billion dollar production. Not a very large accumulation of capital. Since then, however, through the year 1932 American enterprise has paid out in excess of what it has produced 24 billion dollars, and when we add 1933 to that, I am sure that the total will be in excess of 35 billion dollars of loss to private enterprise since the beginning of this depression. That does not take into account the loss in the security market.

"Now, gentlemen, I hold that that has been a very valuable contribution to the problem of unemployment. A very large part of that great loss had been taken by the heavy industries. I know I speak correctly for my own company, and I believe for the heavy industries as a whole, when I say that a great many of us would have been better off financially, far better off, if we had shut down our properties at the beginning of 1931; if we had been locked up and in the care of the custodian, we would have been far better off if we had not attempted to operate then and kept our men at work.

"We cannot continue for an indefinite length of time this enormous loss. We must sell our goods for what they cost us. We must get a volume of business that will absorb the expense of doing business, or we will be forced to shut down and stop all employment within our enterprises.

"It was mentioned this morning that many companies are reaching the end of their resources, and I want to emphasize that as being without exaggeration in any way. Capital goods, particularly heavy equipment, are not sold in response to a specific demand for something that is needed today. Particularly is this true in periods of depression. They are only sold in anticipation of future wants. They are sold to improve ways of doing things that are already being done, and they can only be sold when the buyer anticipates a profit through the enjoyment of their use.

"That profit will arise from these things: First, the cost of the article; second, the cost and availability of the capital for its

procurement, and of course, finally, the opportunity to use it.

"Now, the cost of heavy equipment in this country is today up to the level of prosperous years. We are all finding our costs back to 1929 levels, and that is without any consideration of the cost of carrying our idle properties.

"We cannot absorb additional losses. We must pass any increased costs on to our customers. We are already so high in our costs that we cannot sell our goods. We cannot get our customers to anticipate their future needs, and what is true in my company is true in many others. We must keep our costs to a place that will encourage the producers of other goods to buy our products. They in turn will not do so unless they can see ahead of them a profitable use for these products.

"Now, the second point. We sell our products to be paid for with the proceeds of credit. The heavy industries cannot exist except as there is a flow of capital and credit into business. That flow has been practically stopped at the present time. You are familiar with the figures. I have already used them. I will repeat briefly.

"In 1933 only $138,000,000 of new capital went into private enterprises of America. The normal volume is in terms of $4,000,000,000 to $5,000,000,000 a year.

"In 1933 the volume was 3% of the previous six years' average. We cannot live with a situation of that kind. We certainly cannot increase costs, in the face of a situation of that kind. We must reopen the capital markets of the country. We must again restore the flow of savings into enterprises.

"This is a situation in which the NRA and the Government as a whole can help us. The President in his very admirable presentation of this whole economic situation to us said that when we have a criticism, to make it constructive, and I want to offer this constructive suggestion, that the Administration support the heavy industries by assisting in every way possible to reopen the capital markets of the country. They have been closed by artificial conditions to a very considerable extent. I am firmly of the opinion that the most important obstructions are certain rather drastic provisions of the Securities Act of 1933. I feel that we will not again see a normal volume of capital flowing into enterprise until those provisions are corrected."

Mr. Houston was subsequently elected chairman of the committee to represent the capital goods industries, to which General Johnson referred in his closing address. The other members of this committee are: J. S. Tritle, electrical manufacturers; Alvan Macauley, automobile manufacturers; R. W. Irwin, furniture manufacturers; H. Gerrish Smith, shipbuilding; S. F. Voorhees, construction; Charles R. Hook, iron and steel; C. R. Messenger, farm machinery; Lewis Brown, construction materials; J. R. Hoadley, gray iron; Henry S. Kimball, fabricated metals; Walter J. Kohler, construction equipment; C. C. Sheppard, lumber; James W. Hook, machine tools; F. A. Lorenz, steel castings.

George B. Waldridge

Representing the Associated General Contractors of America, Mr. Waldridge called attention to some chiseling on the part of the Government itself:

"The Government itself is probably one of the greatest violators of the principles of the code of fair practices that there is.

"I will give you one brief illustration with regard to the construction industry. As you know, the Government has loaned many hundreds of millions of dollars to the railroads. Now, the railroads have agreements with their laborers, as I understand it, and the minimum is $15 a week, 48 hours a week, for the common laborer.

"Now, under the construction code of the Government, the contractor has to pay 50c an hour and work 30 hours a week. Therefore, the Government has instructed the railroads to do this work themselves, thereby getting 48 hours a week with the same pay the contractor would pay, the same amount of money, with only 30 hours a week. Now, then, I do not believe the United States Government should treat industry as a stepchild and let its own departments do as they please."

Harold V. Owens

Representing the Code Authority of the Crushed Stone, Sand and Gravel and Slag Industries, Harold V. Owens, president of the National Sand and Gravel Association, said in part:

"These are three very highly competitive industries which have joined together in the one code. We depend upon the construction industry for a market for our products and are a member of the construction industry.

"I have been very much impressed, in listening to the discussions of the past three days, first by the remarks made by Doctor Hettinger, as to the astonishing number of unemployed in the construction industry.

"I am also tremendously impressed by the fact that during the discussions of the past three days, practically nothing has been heard from any members of the construction industry. As to the industries which I represent, we are satisfied with our code. We are not beset at the present time, nor have we been in the years past, with any serious labor troubles. We are anxious to coöperate with the Administration in the establishment of shorter working hours and higher pay.

"At the present time it is impossible for us to do very much along these lines, on account of the fact that the additional wages that we are paying at the present time are coming out of a rapidly depleted capital. We believe that with the return of anything like a normal market, that we can shorten our working week, and that we can raise the wages of our employees.

"If I may ask, Mr. Administrator, the privilege of departing somewhat from the agenda, in order this afternoon, it seems to me that everyone in this room is vitally interested in putting men back to work who are at present unemployed.

"It does not seem right now necessary for me to go into any discussion of hours, and wages, because General Johnson has taken care of that in his remarks this morning. Doctor Hettinger stated at our opening meeting Monday night that the construction industry was the cesspool of unemployment in this country, that there were two and a half million, approximately, of the workers in the construction industry who were now out of work. We are told by the Washington letter writers who profess to be informed with what is to happen in administrative and legislative circles, that the public works program is not likely to be continued, at least to any great extent. We are told by the President that the CWA is to be discontinued, and I believe also that the CCC will not exist very long.

"What will happen when these Government agencies are stopped and the men that are now occupied are added to the ranks of the now unemployed in the construction industry? We have been told that there is a shortage of available labor in some of the highly skilled trades. The men who are now employed in CCC, the PWA, the CWA, are not highly skilled workers. They will be added to those now unemployed in the construction industry, who are not capable of doing any kind of work except what can be offered to them by the construction industry.

"Therefore, it would seem to me, as a member of an industry which is dependent upon the construction industry for the market for its goods, that what interests us most at this time perhaps is not so much a discussion of details of hours of work and rates of pay, as it is to what is to happen with the market for the construction industry as a whole.

"We know that during the decade from 1919 to 1929, that the great market for the construction industry came from private industry itself and not from public works. If I am not mistaken, approximately twelve to fourteen billion annually was spent, some years at least, in that decade, for construction activities. Of that total, approximately eight to ten million was for betterments of a permanent nature from private industry itself. If then, the Government of the United States and the various subdivisions are not going to continue, as they have—some have already discontinued their public works schedules—what is to be done to furnish work for this vast army of unemployed in the construction industry? One of two things must happen. Either this slack must be taken up by private industry, or some other means must be found to employ these workers who are not now on a job. It would seem manifestly impossible that private industry can take up this slack.

"We know that private industry is over-

built and over-planted at the present time, and that it will be a long period before we can look to private industry to take up the slack which will be caused by the cessation of appropriations for public works.

"If this is so, the construction industry must necessarily look elsewhere for its market. There is only one place that it can look, and that will be for capital expenditures which are not made for the purpose of future profits. By that class of capital investment I mean highways, bridges, institutions, parks; in other words, public works.

"I realize, of course, that there is a great sentiment at the present time against any increase in the public debt. It is perfectly natural that such a sentiment should exist. It does seem to me, however—I have no figures at my command to confirm this—that what we must all necessarily be interested in is the total of debt of this nation, both private and public, and I think that if the figures were available it could be shown at this time that whereas there has been an increase in the public debt of a very material amount in the past few years, there has been to a great extent an offsetting reduction in the total of private debt. If this is so, we should not be so alarmed at an increase in the public debt over the next year or two.

"I believe that one of the causes that has contributed most greatly to the present unemployment in the construction industry has been the tendency on the part of states and various other subdivisions of government to stop appropriations for public works, and to depend on Uncle Sam absolutely for all appropriations of that nature. I know that that tendency exists today in many of the states of the Union, and that legislative bodies and administrators in the states are looking to the Federal government for appropriations to carry on public works and to furnish employment.

"I do not know at this time that I have any constructive suggestions to make, except this. I do believe that the Administration should do all in its power to bring its influence to bear on the states and the various other subdivisions of government to resume their public works programs and to make possible the employment of many jobless workers in the construction industry. I cannot see over the period of the next year or two how this matter can be taken care of in any other way.

"I believe too that it will be necessary for the Federal government to continue to some extent the appropriations for public works purposes."

Trade Practices—Open Price Plans

One of the largest group meetings was that on Trade Practices, over which Division Administrators W. A. Harriman and A. D. Whiteside presided. Speakers for the Administration included representatives of the Labor Advisory Board and the Industrial Advisory Board. Their remarks had largely to do with the difficulties and complexities of the price problem. When representatives of industry started to talk the division administrators constantly interrupted to ask questions. It was obvious they were earnestly seeking information. Of course, industry speakers defended the open-price systems, with few exceptions. Those who opposed such price systems were large buyers, such as department stores, mail order houses, etc., which are known to be notorious chiselers when it comes to buying. Much of the discussion was of interest only to producers of consumer goods.

E. Guy Sutton

Representing the Crushed Stone, Sand and Gravel, and Slag Industries Code Authority, E. Guy Sutton said in part:

"The nearest approach to any suggestion that might aid industry to eliminate some of the unfair trade practices referred to in the Act, and to give industry a new lease on life that it might accomplish the Herculean tasks which it is asked to assume, is the operation of the open price policy. Now that meager hope is being attacked by selfish interests and shortsighted theorists, many of whom I wager, have never been confronted with the duty of meeting a pay roll with banks unwilling to loan, except on security such as, were it available, would obviate the necessity to borrow. For example, the representative of the retail stores very ably presented his opposition to the open price policy because obviously he conceived that it might not be to the best and most profitable interest of his constituents, even though the retailers operate under the most effective open price policy that could possibly be devised.

"The opposition to the open price policy from some quarters apparently has been based on the erroneous assumption that uniformity of prices is prima facie evidence that such prices are unreasonable. Furthermore, because certain industries may, in their enthusiasm, have attempted to abuse the open price policy, then all industries who propose to establish such a plan are forthwith indicted and without a hearing having been adjudged guilty. These promises are all unwarranted and the conclusions lack judicial character and therefore should not be accorded undue weight.

"I submit that, if industry is to assume the responsibilities that the President and the officials of the NRA have placed upon it, there must be some means devised whereby industry may be properly and quickly financed to meet this obligation. Purely patriotic duty is not sufficient incentive, and, furthermore, pay rolls are not met by emotionalism.

"In hunting for a way out industry pretty generally has turned to the open price policy as the best method of accomplishing the desired end, and so far as I can learn no adequate substitute for the open price policy has been advanced. So I would urge that those industries who desire to try to solve some of their difficulties by the institution of the open price policy be permitted to do so. Any abuse of the plan, even if attempted, could not long endure with the following natural or prescribed checks:

"First, governmental supervision through representation on code authorities.

"Second, public opinion.

"Third, possibility of reduction of consumption.

"Fourth, unrestrained competition.

"Fifth, justifiable complaints to the NRA.

"In conclusion, I wish to repeat that if industry is not placed in a position to finance adequately and without delay the job that has been assigned to it, I reluctantly predict that the whole structure erected by the NRA will collapse, because it will not stand without the durable foundation of a rehabilitated industry."

Discussion

CHAIRMAN HARRIMAN: "May I ask a question? Have you any suggestions regarding the State purchases?"

MR. SUTTON: "Anticipating the difficulty that might arise, because of the State laws we have proposed in our rules and regulations governing uniform contracts and practices to exclude government units and railroads from the operation of the uniform contract."

CHAIRMAN HARRIMAN: "What effect do you think that will have on your business; in other words, will that suggestion have a serious effect on the operation of the open prices in your particular line, or will it not make much difference?"

MR. SUTTON: "I do not believe it will make much difference. The States especially in our region buy comparatively little of the material used in the States in construction work directly. It is usually sold to contractors."

B. L. Knowles

Representing the Code Committee of the Associated General Contractors of America, Mr. Knowles was very cagey about committing himself on open prices, as a buyer of construction materials. Questions and answers were as follows:

CHAIRMAN WHITESIDE: "As a buyer of material, do you feel that you are in a better position to carry on on a profitable basis by having open prices prevalent among your suppliers?"

MR. KNOWLES: "If those prices are equitably—"

CHAIRMAN WHITESIDE: "I am not talking about the prices, the outcome of that, the method of filing prices—do you find that works to your advantage by knowing your market specifically instead of having

bids come from every direction which are at variance with each other?"

MR. KNOWLES: "As a principle, I think that is all right."

CHAIRMAN WHITESIDE: "You are quite willing to have such price provisions in the markets from which you buy?"

MR. KNOWLES: "Subject to the statement that I think they must be very carefully guarded in the method in which they are arrived at."

CHAIRMAN WHITESIDE: "But, the provisions themselves and the effect of those provisions if properly administered would not conflict with your interests?"

MR. KNOWLES: "I do not think so, if properly arrived at and administered."

Lewis H. Brown

Representing the Asbestos Code Authority, Mr. Brown made an excellent address on the first principles of price establishment and distribution problems. A few extracts follow:

"If industry is to plan its production so as to maintain wage schedules and employment and so as to meet future increased costs caused by shorter hours and still higher wages, then it must also plan the merchandising and distribution of its goods so as to secure this distribution at the lowest possible cost and in an orderly and sensible manner. With practically all industry operating in the red, which means below cost, there can be no other solution than increased selling prices.

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"Now, some of the criticism about prices apparently completely overlooks the fact that the President has repeatedly stated that prices must be advanced to the general or approximate level obtained in 1926. The whole effort of the Government in its agricultural activities is concentrated in the effort to raise prices to an equilibrium with manufactured goods. One of the reasons given for the devaluation of our currency was to induce an upward price trend in commodities.

"Yet one of the most frequent criticisms of the NRA and of industry generally is that prices are being raised. The inference is that all business men are profiteers whereas no group is working harder to bring back prosperity than those very men.

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"But some people are asking: 'How do you account for the uniformity of prices that develops under any system of price differentials and price publicity?' And in answer to that I ask you to check the retail prices of goods in two competitive chain stores operating in the same town. You will be surprised at the degree of uniformity and the reason for it is that if the price is out of line for any length of time, considering the service rendered, the business will flow to the store offering the greatest value. A retail store across the street that offers additional services such as delivery and charge accounts can—and does—charge a higher price for the same article.

"But as between two such stores, publicity and competition bring about approximate uniformity. And so it is between manufacturers and their channels of distribution.

"One customer can get an inside price when the functions performed are identical, only by a secret rebate or concession, or some similar means. But if such prices are public to all the trade concerned, the manufacturer making them must give the same price to his other customers who perform the same function. And in so doing he automatically establishes a new price level for the entire market which sooner or later of necessity is met by competing manufacturers.

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"The NRA has gone a long way in making possible the orderly working out of this problem. But no organization yet established in Washington, nor any bureaucracy that mind has yet conceived can ever efficiently operate the industries of this country or police or enforce a method of distribution. This job can be done only by men who have devoted their lives to accumulating the particular experience so vitally necessary.

"We cannot follow two systems at the same time. If the old system of 'laissez faire' is to be followed, then we must remove all restrictions and let the law of supply and demand and the competitive struggle go on to the bitter end. We cannot regiment ourselves as to hours and wages and other similar restrictions without following through with planned distribution. And just as this country could not exist half slave and half free, so it cannot exist with regimentation of every phase of production and continue with chaos in distribution."—Lewis H. Brown.

"We have abandoned the old economic theories and we cannot adopt the new without some help from the Government. This help the President and the NRA are doing their utmost to supply.

"But in the final analysis, the success or failure of this plan lies with the men who operate the industries and the distribution channels of this country—those very men who are represented here in this great conference by representatives and leaders of their own choosing."

Discussion

CHAIRMAN HARRIMAN: "The NRA has no right to legislate or change anti-trust laws, except on conclusive proof that an emergency exists, which makes it not only vital, but almost necessary."

MR. BROWN: "What I am trying to convey is this: I realize the NRA cannot eliminate the anti-trust laws, and I do not believe generally business men are worrying about the anti-trust laws under this NRA Code Authority Administration. They are going ahead, accepting in good faith the statement of the President and this Administration as to its purposes, but what is in the back of every business man's mind is this, when is the emergency going to be over? When are we going to change this NRA set-up? What is going to happen to my individual company?

"I have sat in these meetings and agreed to certain changes and distribution, methods and technique, trade practices. The ones I have changed are the ones I have found by experience resulted in a satisfactory result for me under the old conditions, but now I have agreed to change them. When will I wake up some morning and find out the NRA has passed out of existence, the emergency is over, and the old laws are on the books and become operative the next morning?

"You cannot build confidence with that kind of uncertainty over the heads of American business, the American business is not going to go ahead and spend money on plant expansion or rehabilitation, or take aggressive steps to bring back real prosperity unless they do have confidence in the future. This is fundamental."

CHAIRMAN HARRIMAN: "I will make a brief statement. I think Mr. Brown has touched on a vital question. He asks the question, where is the NRA going. That is the question that primarily is for code authorities to answer. That is a question which is going to be settled by legislation on the Hill, and by the President. It is a matter, however, that I am thoroughly satisfied is one that through thinking and your honest opinion will fundamentally be settled—you will settle it, and as Mr. Brown says, it is high time for code authorities to be giving that serious thought."

Edwin S. George

Mr. George's (Power and Gang Lawnmower Code) contribution was in part as follows:

"A refusal by NRA of open prices is equivalent to the determination by NRA that business shall not be conducted fairly, honestly, and above board. Such refusal will constitute a decision by NRA that public welfare requires the continuance of deception and trickery. The claim is made that open prices and adherence to them—and there must be adherence or there will not be open prices—are instruments of price-fixing and monopoly.

"The President says prices must stop at that point where they become destructive. Competition tends to drive prices to that point. This, perforce, produces price uniformity. The objection to open prices is that they create uniformity. This is not correct. The uniformity comes from competition and the stop point requested by the President and demanded by the Recovery Act."

Trade Practices—Production Control

The chairmen of these group meetings were Maj. George L. Berry and George Buckley, of NRA. Other speakers for the Administration were Father Haas, representing the Labor Advisory Board, George S. Brady, deputy administrator, and Corwin Edwards, Dr. Paul Douglas, representing the Consumer's Advisory Board. The NRA representatives all were against limitation of output or allocation of business on broad general grounds that seemed sound and logical. However, they appeared quite convinced that if such restriction of output was necessary as an emergency measure, it was not safe to allow industry to do the restricting; it should be done by government. Their supreme faith that government was more to be trusted than industry in seeing that the public got a fair deal was pathetic to those who have had experience in business dealings with public officials.

The speakers for industry took both sides of this controversy, some, like lumber, fertilizer, textiles, etc., making excellent defenses of the restrictions on production, and on new productive facilities, in their codes, but almost invariably on grounds of expediency to meet an emergency rather than as a basic principle. Manufacturers of machines, plant equipment, etc., in many instances opposed such restrictions on output. W. E. Whipp, representing the Machine Tool and Forging Industry, summarized reasons as follows: "Restriction of capital expenditure in codes will:

"(1) Tend to hold wage scales down and lower the standard of living of large masses of our people, which standard is now so low that raising it to the limit of decency would create a demand for goods far in excess of the 1929 level.

"(2) Tend to create monopoly of present production facilities, to raise the level of prices of goods far higher than need be, and is therefore not in the public interest.

"(3) Still further depress the capital goods industries where the bulk of the industrial unemployment now exists."

"(4) Stifle individual initiative so essential to progress, and put a premium on obsolesence.

"(5) Tend to retard science, research and invention, which coupled with typical American industrial aggressiveness has placed America in the lead of industrial nations."

Otho M. Graves

Representing the Code Authority of the Crushed Stone, Sand and Gravel, and Slag Industries, its chairman spoke in part as follows:

"Regardless of the causes of this depression, we know the mechanics of it. We know that buying power began to slacken off, and when it did there was a reduction in production. As that reduction occurred it was necessary, because of increased costs due to lower production, to effect economies. Those economies were immediately effected, as manufacturers knew, by reducing wages. As wages were reduced—and that is the first vulnerable point of attack to lower cost of production—buying power fell off still further, and as buying power further decreased production further decreased, and so the vicious circle or spiral was established and down we went.

"Now, we all know that. We know the mechanics and the spirit with which the Recovery Administration is approaching a cessation of that downward spiral. It can only be done in two ways. The first is the one that receives the greater emphasis, and I think perhaps unfortunately. It is this, that we reach out in a sense and grasp with a mechanical hand this spiral as it goes down, to stop it. And how do we propose to stop it? By saying that we have—that we must have more jobs, and so we should; and they should have higher wages, and so they should; and that more jobs and higher wages will result in increased purchasing power, and increased purchasing power will necessitate increased production; increased production will tend to lower costs in and of itself, and lower costs will permit higher wages, and increased production will further permit and require a greater number of jobs. Consequently, with greater buying power, with a greater number of jobs, with higher wages, the spiral will start upward.

"Now, I know that is true, and I think you will recognize it, for the perishable good industries, but I think perhaps the distinction between the perishable goods and the capital goods is at times lost sight of. That will work for the perishable goods unquestionably.

"In the capital goods industries—there is no immediate effect of increased buying power. The Government is pouring money into public works—and rightly. I am in full sympathy, as you are, with what our President is doing and with what the Recovery Administration is doing. I have the highest admiration for the National Recovery Administration and its staff and personnal, and I have had some opportunity of working with them to some degree. We recognize, of course, that that does not have an immediate effect upon the capital goods industry and something else is required. It makes no difference how much purchasing power is increased, capital goods are not going to be purchased to any greater degree. Now, with the government pouring in its billions of dollars into the capital goods industry, the time is approaching, and we can see the handwriting on the wall, when that will have to stop, and the only thing to replace it is an inflow of private capital to take its place. What is going to lure this private capital into the capital goods industry? Only one thing—profit—and opportunity of profit.

"How can we hold out any opportunity of profit in capital goods industries, which are running, as a matter of fact, at 10% of capacity?

"If we can hold out some opportunity of profit in these capital goods industries, private capital will immediately flow in and for no other reason. There is no compulsion about it, and it won't let go of itself. The money situation is unquestionably relieved to some extent now.

"What will cause its relief other than profit I do not know. That certainly will. That is, the opportunity of profit.

"How can that opportunity be created? In two ways, of course. I speak now solely of the capital goods industries.

"I for one, though I seem to be in the minority this afternoon among the speakers, and I don't know how I stand as to the rest of you, and as to that, I do not particularly care, whether or not you agree with me on this—the other thing being the limitation of the investment of new capital is as necessary an adjunct to recovery of the capital goods industry as is some form of price control. This is an emergency. This economic emergency is just as real and of as vital concern to the American people as the military emergency of 1917 and 1918. At that time we perfectly well knew no man's liberty could be restricted without due process of law, and upon his being charged with a criminal offense, and yet the national government, with the sanction of every loyal American drafted every American man of draftable age to serve with the American armies overseas or in such post as the chief of staff might direct.

"We have a similar emergency here which has been declared by Congress, and we must adapt ourselves to it. A limitation on new invested capital in this capital goods industries or in the extension or enlargement of their productive facilities, I submit to you is necessary, if intelligently applied.

"The lack of limitation of production is what is holding back inventive genius in many of these industries, because the established manufacturer fears the inroads of irresponsible competition, and the racketeers, as they have been referred to here this afternoon. Those are the ones who hesitate to invest hundreds of thousands of dollars, which I personally know in many, many plants could well be spent toward the improvement of processes, toward the lowering of cost of production, toward bettering the methods of production. They hesitate to spend this money, because of the very risk to which the other speakers have referred and to which I again call your attention, of the unstableness of their industry.

"If the producers in the capital goods industry knew they would be protected against vicious and harmful competition, which has so wrecked them and brought them into the

chaotic condition they are suffering from today, then there would be a flow of capital toward increased improvements, and the codes with which I am familiar state that nothing in the section shall be construed as in any sense preventing the lowering of costs or improving methods of operation.

"Of course, that must be so. No manufacturer should or would, except under the direst compulsion, sign away his right to lower his cost of production. I submit to you that reasonable and intelligent restriction of the entrance of new capital into the capital goods industries, with some reasonable price control is not monopolistic, if intelligently exerted. It does not destroy inventive genuis, but rather promotes it, and in this moment of the direst extremity this nation has ever experienced, such steps, intelligently, carefully administered, and removed, when the opportunity for removal first shows itself is our greatest need today."

Small Enterprises and Minorities

A. W. Riley and Leon Henderson presided at the group meeting dealing particularly with the problems of small business. Representatives of NRA described their efforts to see that the small operator is protected from his large competitor, but as John Frey, member of the Labor Advisory Board said: "There is one fact connected with the small employer which must be kept in mind, and that is that there has been a certain number in our country who only remain in existence because they have established much lower standards for their employes than were given by their competitors and their only hope of remaining in the field was to be able to undersell competitors because it was possible for them to have materially lower labor costs, due to substantially lower wages."

It was at these sessions that C. C. Sheppard, representing the lumber industry introduced the now famous letters of Congressman H. P. Fulmer, of South Carolina, to some of his lumber mill constituents back home, advising them to scrap the lumber code and "operate their mills on a common sense basis." Congressman Fulmer is a small saw-mill operator himself, and appeared later at the hearing to defend his letters. The burden of his argument was the NRA was doing nothing to help the small operator.

Code Administration

The one universal complaint of all industry is that codes are not being complied with. Hence some of the popular sessions were those on code administration where Donald R. Richberg and Alvin Brown presided. Mr. Richberg began by warning his listeners that some industries were setting up code authorities that looked very much like "bureaucracies" to him. John L. Lewis, representing the Labor Advisory Board, argued for labor representation on the code authorities.

Speakers for industry recited their trials and tribulations trying to get whole-hearted compliance with codes and trying to collect assessments to pay for administration of codes. The last mentioned is a real problem and many speakers want more active NRA support in collections.

James E. Bennett

One speaker kept his listeners in a constant gale of laughter by his apt descriptions of codes, etc. He was James E. Bennett, representing the Printing Equipment and Trade Code Authority, and here are some of his wisecracks:

"This code is just another law. It is another law, not made as other laws by experienced legislators, but by hundreds and thousands of amateur legislators, who come down here and deal with a body of very earnest and very zealous but amateur persons necessarily. And so a multitude of amateur legislators have produced 300 very amateur laws. But they are laws, and we must obey them. And there is nobody living can give us an interpretation that we can follow and be sure that we are safe.

"The information was given to us last night in a book that we had. On the face of it it said that 'Anything contained herein is subject to the disapproval of the Administrator.' I sat on mine, because I thought it would raise me up a little, and in that way I would be elevated. And the Administrator is exactly right, and I agree with him. He is wise. He has no authority to give a definite opinion on a law. Nobody has. Our administrator preceding last night said the same thing, and he is right. Mr. Richburg is a very excellent lawyer. And he said he was giving no conclusions. And he won't, not even if you retained him and paid him he would not, because he has not a right to.

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"I would not want you to think that I am opposed to this, because I am not. It is a law, and I am for every law of the United States, and I am going to do my utmost to uphold the law and work it out and cooperate; and we all have to. But I believe that I have got to do it my own way, and use my own judgment and understanding, taking the best advice I can get.

"In this way we will solve the question of overlapping. We will solve the question of collection of our dues from recalcitrant members; recalcitrant is another word I had not heard for a while. But it is coming right along now to chiseling. A chiseler is a man who under-sells you.

"And I am not blaming anybody. I believe that every one of these men in the NRA that I have met in all of these various divisions are doing their utmost. They have no axes to grind, or no stocks in our companies, and they are not going to sell us short, or long, or any other way. They are doing their best according to their lights. Their lights higher up. Each man is afraid if he does something the man higher up will cancel that. They are doing their best, and have to do their best. We men must work with them honestly and fairly and encouragingly."

Morris E. Leeds

As a member of the Industrial Advisory Board Mr. Leeds contributed this bit of wisdom:

"As we understood the theory of the National Industrial Recovery Act in relation to industry, it is that industry is given new and large powers to effect self-government and is very strongly advised to come in under codes and achieve that objective while government cooperates to see that the codes are drawn in the public interest, to furnish the sanctions to deal with recalcitrants and finally has a place on the Code Authority in order that it may make sure that all actions are in accordance with the understandings and do not run counter to the general good. By this arrangement, industry is squarely charged with the responsibility of conducting its affairs so that the public interests shall be served. We believe that it would be unwise to dilute this responsibility by asking others to share it who would come with a limited and special interest only.

"Consumers' interests are being safeguarded much more adequately than they seem to realize by the fierce desire of those of us in industry to win their patronage. That desire is so fierce that we tend to destroy our own interest, the interests of working people and finally that of consumers' themselves in our competitive struggle to win their favor."

Conclusions

There is a great deal more of interesting discussion that might be quoted, but if the reader will absorb what has gone before, he may feel pretty sure he has a fairly complete picture of the First National Code Authority Conference. It was impossible for any member of a code authority attending the conference to get a complete picture. The usual procedure was to assign one or more members to each group meeting. The code authority assembled after these meetings, compared notes, discussed the papers and speeches, and thus got the benefit of a liberal education in code authority duties and responsibilities. The members of the rock products industries may be sure that their code authorities were conscientiously on the job, and that the experience and knowledge they acquired was a good investment.

Effect of Different Cooling Conditions on the Quality of Cement Clinker

By W. R. Chandler,

Chief Chemist, Idaho Portland Cement Co., Inkom, Idaho

IT HAS BEEN for some time a question among cement technologists as to the advisability of using a water spray on hot clinker in order to promote cooling. Providing the plant in question does not have a large storage space, so that the clinker may have time to air cool, it is necessary that some means of rapid cooling be effected before grinding can take place without danger of overheating the finish mills.

Air cooling by some of the more modern shaker coolers appears to be replacing the rotary cooler, as the shaker type not only effectively produces a clinker which is cool enough to grind immediately, but also furnishes an easily collectible supply of combustion air with a high degree of pre-heat. Remarkable results in fuel economy have been obtained in several plants, due to the care exercised in utilization of this recovered heat.

It is established as a premise that a definite quantity of heat is carried out of the kiln by the hot clinker. The favored method of using a portion of this heat is to return it to the kiln in the form of pre-heated combustion air. It is quite conceivable that other forms of heat exchangers might be used. For instance, under certain conditions, it might be more economical to use this clinker heat for pre-heating of boiler feed, where waste-heat steam plants are employed.

However, the *rate* at which the clinker cools and the actual means used in cooling may have considerable influence on the quality of the resultant clinker.

The inference which may be drawn from the work of Dahl, as published in Rock Products, is to this effect. It appears to the writer that this work might serve as an excellent guide, but that no practical results may be directly deduced from a study of it. It would seem that the securing of optimum results in each plant must be sought under the conditions peculiar to that plant.

Conditions Must Be Studied at Each Plant

At our plant the clinker falls from the kiln discharge into a pit, through which a drag chain of the refuse type is traveling. This continues out of the pit through a tunnel 45 ft. long. The cross section of this tunnel has an area equivalent to the throat discharge of the kiln, with the exception that its open or exit end is somewhat constricted in order to increase the velocity of the incoming air at this point. Natural draft of the kiln and a small booster blower located at discharge end promote a good circulation of air through the tunnel. Both primary and secondary combustion air, as well as hot air for coal drying, are taken from the clinker pit.

Fifteen feet beyond the open end of the tunnel is located a spray nozzle of the full cone type. This is directed downward against the chain carrying the hot clinker. The return half of the chain passes over head. Enough water is used so that, under normal load of clinker in the chain, the clinker will be dry again after having traveled 20 ft. farther on. This practice of spraying has been severely criticized, as regards both its effect on the heated chain and the quality of the clinker. Inasmuch as available storage space for clinker is somewhat limited, it has been so far necessary to use it in order that the clinker may be cool enough to grind within a reasonable length of time.

The investigation as outlined here was conducted primarily to determine just what effect this spray might have on clinker quality, and secondarily, how other experimental conditions of cooling might affect it. In addition, a troublesome condition of false set has always been prevalent in the product of this plant, and every means known has been taken to cure it. The finish mill has been artificially cooled within the dangerous limit for gypsum, and exhaustive tests have been conducted in an endeavor to determine if alkali carbonates were the cause of the trouble.

The conditions appear to develop three days after the cement has been ground, lasting for approximately thirty days, and then the cement becomes normal. Storage, as soon as ground, in air-tight containers prevents its development. This condition is most easily detected in the standard Vicat determination of normal consistency. When the false or gum set exists, an excessive amount of mixing water may be used. In fact, so much that the paste becomes so sloppy as to be difficult of manipulation. In spite of this, when the Vicat needle is released, it will hardly ever penetrate more than 6 mm., and there will be no further progress into the paste.

The possibility that conditions of clinker cooling might be partly responsible for this setting difficulty further prompted this investigation.

Treatment of Samples

Samples of clinker were taken in an identical manner each day for five consecutive days from the kiln discharge as follows:

No. 1, designated as "AC," was taken directly from the nose of the kiln and thinly spread out on a clean steel plate. Upon this was directed the blast from a cold air blower. The clinker became black within thirty seconds and was cool enough to handle within fifteen minutes.

No. 2, designated as "WC," was taken in the same manner as No. 1 and at the same time. This sample, however, was immediately plunged into water so that it was completely submerged.

No. 3, designated as "TAC," was taken from the discharge end of the drag system without the water spray being on.

No. 4, designated as "TWC," was taken at the same place as No. 3, but with the spray running normally on the chain.

The last two samples were taken at a time calculated so that the clinker would be from

the same kiln discharge as when No. 1 and No. 2 were taken.

All samples were stored in air-tight tin cans at all times when not being worked on.

No. 2 and No. 4 were thoroughly air dried before sealing in cans. Each sample weighed about 25 lbs.

After all samples were collected a batch of cement was made from each one. This was ground in a laboratory ball mill, using an 18-lb. charge of crushed clinker and added gypsum. The mill was given the same number of revolutions for each grind as determined by a counter.

Chemical Analyses

A chemical analysis of each sample of cement was made, and from the results was calculated the compound composition. These are shown in Table No. 1. With the exception of "Ignition loss," it was not anticipated that any significant differences in composition would result from varying cooling conditions. This seems to be borne out in the table of compositions. For the sake of brevity only the average of the five groups of samples are shown in both the chemical and physical tests.

Physical Tests

As noted above, all samples were given identical treatment and strict adherence to A. S. T. M. methods of testing were followed. Let us now examine the physical characteristics of these samples.

Color and Workability

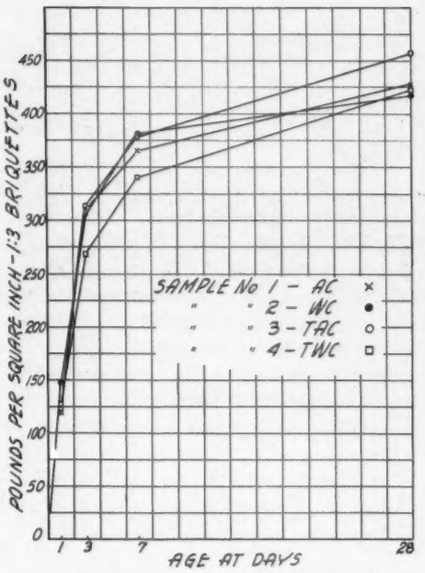
With the exception of Sample No. 2, all cements had a very uniform color. Sample No. 2 was several shades lighter in color, and while working the cement into paste or mortar, it had a noticeable higher degree of workability. No appreciable difference in workability was observed in the other three samples.

Fineness

The clinker obtained from Sample No. 2 was decidedly easier to crush, preliminary to grinding. No device was available for surface area measurement, and it is quite probable that this sample would exhibit a much higher percentage of the small sizes.

It is problematical whether the differences in the strengths, as obtained, would have been greater if the same fineness had been aimed at for each sample. The fact remains that the coarsest cement showed the highest strengths, and the finest cement developed a high enough strength at the early ages, but did not maintain its increase at 28 days to conform with the other samples.

The assertion has been made, by manufacturers of shaking grate type coolers, that the clinker treated by this means has a higher degree of grindability than other forms of coolers. Sample No. 1 was taken in such a way as to simulate, as closely as possible, the conditions of cooling which would obtain with a shaking grate cooler; and their contention is borne out by the fineness results obtained. It is not considered proper that Sample No. 2 should be included in this comparison; being a cement cooled in a manner which, in all probability, would only be used in very exceptional cases.



Record of clinker samples

Setting

No marked difference in the standard test for setting time was observed in any of the samples, but very pronounced differences were obtained during the examination for false set.

The time of true set is somewhat shorter than would be desirable for commercial cements. This is, no doubt, due to the high percent of C_3A in this brand of cement, coupled with a lower percentage of SO_3 than is usually carried in the product of this mill.

During the test for false set (Table No. 3) the sample cans were open during the entire time, and the cement was stirred occasionally to expose it to the air. It is not attempted to explain why the normal consistency increased with continued exposure to the air.

In obtaining the consistency of Samples Nos. 1 and 3 the cement reacted normally at all times; i. e., upon release of the Vicat plunger an initial immediate penetration of 6-7 mm. was usually observed, and from that time up to the end of the 30-second interval, the plunger slowly sank into the paste.

With Samples Nos. 2 and 4, however, very different results were obtained. The initial penetration of the plunger varied between 2 mm. and 6 mm., but no further movement was recorded after the first drop. At the end of the 10-day period of exposure of Sample No. 4, the false set was unusually pronounced. Using 26% of water, this paste was of a sloppy consistency while working, but a noticeable stiffening occurred when shaping into the ring mold. A total penetration of only 2 mm. was observed with this sample. In short, the percent of water recorded in Table No. 3 does not represent the normal consistency of the samples which had developed a condition of false set. The amount of water was raised to the point where the operator could still manipulate the paste on the table, although very wet. Upon neither Samples No. 2 or No. 4 was it possible to determine the correct normal consistency.

It should be noted that this condition of setting should not be confused with flash set. The paste, while working, does not exhibit any appreciable rise in temperature; and after forming into a pat, will continue to show a decided impression of the Gilmore needle, up to its normal setting time.

The theory has been frequently advanced that this condition is responsible for low strengths, in that this early stiffening prevents the operator from properly working the mortar into the molds without using an excessive amount of water.

TABLE NO. 1—COMPOUND COMPOSITION

Sample No.	1.	2.	3.	4.
Lab. No.	AC	WC	TAC	TWC
C_3S	34.82%	35.62%	34.93%	33.65%
C_2S	38.48	37.07	38.60	38.71
C_3A	12.40	12.08	12.56	12.37
C_4AF	7.52	7.87	7.37	7.50
$CaSO_4$	2.65	2.55	2.65	2.65
CaO	1.57	1.61	1.29	1.65
MgO	1.57	1.57	1.56	1.60
Ignition loss	0.99	1.63	1.04	1.87

Each group as given is the average of five separate samples taken on five consecutive days.

TABLE NO. 2—PHYSICAL CHARACTERISTICS OF THE CEMENT

Sample No.	1.	2.	3.	4.
Lab. No.	AC	WC	TAC	TWC
Fineness*	14.52%	12.32%	16.53%	15.14%
Soundness	OK	OK	OK	OK
Setting time:				
Initial	88 min.	100 min.	94 min.	110 min.
Final	202 min.	218 min.	198 min.	195 min.

*Residue on 200-mesh sieve.

TABLE NO. 3—CHARACTER OF SET AND NORMAL CONSISTENCY AFTER BEING EXPOSED TO AIR

Exposed	1 day		3 days		5 days		10 days	
	N.C.	Set	N.C.	Set	N.C.	Set	N.C.	Set
Sample AC	23.0	Norm	23.8	Norm	24.1	Norm	25.8	Norm
Sample WC	24.2	False	24.5	False	24.6	False	26.0	False
Sample TAC	24.0	Norm	24.0	Norm	24.4	Norm	26.2	Norm
Sample TWC	24.0	False	24.4	False	24.6	False	26.0	False

TABLE NO. 4—TENSILE STRENGTH; 1:3 BRIQUETTES

Lb. sq. in. Each figure is the average of fifteen specimens.

Lab. Sample	Age 1 day	3 days	7 days	28 days
AC	121	308	365	429
WC	148	306	381	417
TAC	122	313	380	457
TWC	127	268	340	422

As the strength specimens on each sample in this series were made, a normal consistency was determined. These were made before exposing the cement to the air, and no evidence of false set was present in any of the 20 different samples.

Strength

A summary of the strength results is given in Table No. 4, and in Chart I it is plotted graphically.

With the exception of the erratic behaviour of Sample No. 2, the results after one day definitely illustrate how the action of a water spray on hot clinker can affect the strength quality of the resulting clinker. It would also appear that a better strength would be obtained by a rather gradual cooling, than by a sudden quenching with cold air.

Summary and Conclusions

In considering the relation between the advantages or disadvantages of cooling hot clinker by different methods, two questions are immediately apparent. In the first place, it might be asked what would be the effect upon the grindability of the clinker; and secondly, what changes might one expect in the resulting strength qualities. In addition to these evident considerations, a most important characteristic may be affected—the nature of the setting property.

The manufacture of a commercial cement which will have sufficient tensile strength, and ground to pass the usual specifications, does not present a difficult problem to the technical staff of a cement mill. On the other hand, the presence of a condition of false set in the product will not only be a source of annoyance, but may be an actual potential danger to the successful acceptance of the cement, when submitted to the testing bureaus of other institutions.

It is satisfactorily demonstrated that for this installation, at least, the condition of false set may be caused by allowing a water spray to strike the cooling clinker.

As stated above, the effect of cooling conditions on chemical composition is evident only in the "Ignition loss," probably due to a slight superficial hydration.

The normal consistency of the freshly ground and properly stored cement, as well as true setting time, is not affected to any marked degree by differing conditions.

The grindability of the clinker is affected to such an extent that it was possible to predict quite closely the fineness of each of the 20 samples, after the fineness of the first one of its respective group had been determined. In general, it may be stated that the quicker the cooling, the greater the ease with which the cement may be ground.

Soundness of the finished cement is not affected by rate of clinker cooling. All samples were perfectly sound under steaming test.

The strength of a clinker which is rapidly cooled is increased at early ages up to seven days, but does not show a sufficiently satisfactory increase after that age. Optimum results seem to be secured by a rather slow cooling of the clinker, without permitting water to come in contact with it while cooling.

It is not intended that the results as given here should be taken as a criterion for all similar installations of clinker cooling. There are too many obscure variables existing, which might have a very different effect upon the quality. However, it is hoped that the results of this work may be of assistance in cases where similar installations may exist.

New Ready-Mix Plant

THE COLONIAL CONCRETE CO., a new concern distributing transit mixed concrete for building construction, paving, etc., has been established at the Orange quarry in West Orange, N. J. The concern is operated by Harry J. Axt and Adolph R. Frank, former sales and production managers, respectively, for John P. Callaghan, Inc.

TVA To Build $300,000 Floating Concrete Plant

CONTRACTS totaling nearly $300,000 have been placed by the Tennessee Valley Authority for equipment comprising a floating concrete mixing plant to be utilized in construction of the General Joe Wheeler dam on the Tennessee River above Muscle Shoals. The purchases, announced by C. H. Garity, are as follows:

Four steel barges—Ingalls Iron Works Co., Birmingham, at $61,600.

Bins, conveyors, batcher and tanks—Blaw-Knox Co., Pittsburgh, Pa., at $31,852.

Two cement pumps—Fuller Co., Catasauqua, Pa., at $10,870.

Four tilting concrete mixers—Norris K. Davis, San Francisco, Cal., at $21,295.

Four cranes, equipped with steel booms—American Hoist & Derrick Co., St. Paul, Minn., at $69,192.

Six gantry cranes—Clyde Sales Co., Duluth, Minn., at $98,254.

The equipment will be mounted on barges so that it will be possible to have an extremely flexible, mobile outfit in order to facilitate construction operations at the dam site, at which point the river is more than a mile in width.

Open Price Clause in Ready-Mixed Concrete Code

AS APPROVED by Chief NRA Administrator Johnson, the code of fair competition for the ready mixed concrete industry contains the usual labor sections and very definite provisions to facilitate regional code organization and enforcement.

Largest of the regions mapped out by the code includes Washington, Oregon, Idaho, California, Nevada, Utah and Arizona—designated as Region No. 7. To encourage local organization under provisions of the code, producers are permitted to designate local "marketing areas." The committee elected in any marketing area, subject to the approval of the Code Authority, may adopt the open price policy. This provision calls for price filing five days in advance of effective date; terms and conditions of sale must be filed along with the actual quotations.

One of the special trade practice requirements is that members of the industry "shall make quotations of price subject to a charge for waiting time for trucks in excess of a maximum time established by the committee of the marketing area." Another provision specifies that "all members of the industry shall give preference in purchase of materials to a material producer or dealer" who complies with the provisions of the code in his industry.

Stop Loss Cost Provision

The code prohibits any ready mixed concrete producer from selling his product at less than "an amount equal to his prime cost thereof plus 10%." This provision, however, is subject to minor exceptions and to such action as the Code Administrator may deem necessary after the code gets under way in the industry.

Recent Contract Prices and Prices Bid

Madison, Wis.: State highway commission received 14 identical bids for 500,000 bbl. of portland cement. The Manitowoc Portland Cement Co., Manitowoc, Wis., offered to supply the entire 500,000 bbl. Mill base prices were as follows: Buffington $1.60, La Salle $1.60, Manitowoc $1.80, Mason City $1.70, and Steelton, Minn., $1.80. The delivered prices were the same in each case.

Mt. Holly, N. J.: Burlington county freeholders awarded contracts for highway materials as follows: Philadelphia Slag Co., 8000 tons of crushed slag at 93¾c.; Lamberville Traprock Co., 18,000 tons of crushed stone at $1.25; Warner Co., 1500 tons of gravel pebbles at 70c.

Little Rock, Ark.: The United States Forest Service and the State Forestry Commission have awarded a contract to the Ash Grove Lime and Cement Co., Kansas City, Mo., to furnish two carloads of cement to build forest observation towers in Arkansas. Seven companies submitted bids and the contract was awarded to the lowest bidder after freight costs from point of shipment to Banks and Malvern had been computed. One carload will be delivered to each place. The delivered cost to Banks will be $1.828 per bbl., and to Malvern, $1.665 per bbl. It was necessary to compute the bid and freight to five decimal places in some instances to determine the low bidder.

Youngstown, Ohio: City purchased 300 tons of cold patch (asphalt-treated slag) at $4 per ton from Standard Slag Co.

Akron, Ohio: City bought for street repair work 4000 tons of slag at $1.75; 1500 tons of gravel at $1.45; 1000 tons of limestone at $1.64, and 5000 tons of sand at $1.35. The business was divided up between several local dealers.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Pittsburgh, Pa.

The Hydration of Cement and the Strength of Its Products. A. Eiger, of Warsaw, has been carrying out an extensive study of the degree of hydration of cement and the resulting strengths obtainable, whether in neat cement, in mortar, or in concrete, all three being systems composed of cement gel and broken solids. The depth of the hydration of the cement was determined with systems of known size distribution by observing the densities. Completely hydrated cement was assumed to have a density of 2.13. The ground cement could be suspended in a suitable liquid in a pycnometer.

Samples were taken from a tube mill at every meter, the size distribution was run, and compressive strengths were determined after 1, 3, 7 and 28 days' storage. On plotting strengths against specific surface areas, it was found that, whereas the early strengths increased with the fineness, the 7- and 28-day strengths flattened out beyond 2000 cm.²/g., the finer fractions having all been hydrated early in the game. The curves for the relation between the degree of hydration and compressive or tensile strength were flat S-shaped, with a nearly linear character in the middle range.

Four different cements were mixed neat with 25% water and after storage for 1, 3, 7 or 28 days were reground through a 254-mesh sieve, mixed with 15% of their weight of water and compressed into 30x30-mm. cylinders under 5600 lb. per sq. in. pressure. The calculation of the rate of hydration indicated that the previously hydrated gel did contribute appreciably to the strength under these conditions.

On repeating the experiments of Work and Lassiter, he obtained similar curves showing the relation between the water of combination, the degree of hydration and the water-cement ratio. The maximum bound water was found to be about 12%. Working with four neat cements, mixed with 25, 40, 60 or 80% water, on drying in an air stream to constant weight to 30 deg. C., or by drying at 110 deg. C., or by grinding fine and determining the density in the pycnometer, similar results were obtained for the voids in the cement and the strengths under compression The latter were found to equal a constant A divided by another constant b, the latter having as exponent the fraction $V_o/(V-V_o)$, where V is the total volume and V_o is the void space. The bound water must be allowed for and not regarded as causing voids.

If the famous Abrams' formula is considered, maximum strength is obtained where $W/C=0$, while with the Eiger equation it comes when $W/C=0.21$. To obtain any perceptible strength, about 13% by weight of the cement should be hydrated, therefore the strength may be regarded as proportional to the amount of cement used and to the total amount hydrated less 13. Any concrete or mortar system has a certain maximum value, which is reduced by voids or by reducing the cement content. Eiger finally shows how his formula is similar to those proposed previously by Graf and by Inge Lyse. (This digest has been prepared from a copy of the manuscript to be published shortly by Concrete Publications, Ltd., under copyright.)

Hydrated Lime. Prof. E. Suenson has made a study of high calcium, air-separated, hydrated limes in comparison with the usual lime putty prepared by soaking in a pit. It seems that the hydrated lime has only recently come on the market in Copenhagen. He compares a hydrated lime burned in a rotary kiln *A*, another prepared from lime calcined in a shaft kiln *B*, and a lime putty which had been soaked for at least six months. He mixed 8 weights of $Ca(OH)_2$ with 92 of sea sand and compared the consistencies by means of a flow table. The lime putty required more water to produce a mortar of a given consistency than did either hydrated lime, which were about alike in this regard. But the former gave a mortar which was appreciably stickier and fatter.

Mortar bars were made up 2x2x12 cm. and were stored either in the laboratory air continuously, in the laboratory air with 10-minute immersion every 7 days, or in a damp closet. The bars were first broken in flexure at various ages and then the fragments were crushed. The drying in the air of the laboratory brought the strength up much faster than the moist storage for the first 28 days, after which the strength remained constant unless the specimens were moistened occasionally. This resulted in continued increases up to the end of the experiment after three months. The specimens stored under moist conditions acquired strength much more slowly, but from 28 to 91 days the flexural strength increased more rapidly than, and the compressive strength as rapidly as, when the specimens were immersed once a week for 10 minutes

The rotary kiln lime gave highest strengths, reaching 380 lb. per sq. in. in flexure and 800 in compression in three months. An interesting point brought out was that the flexural strength of specimens made from putty was close to their compressive strengths.

The course of the carbonation of the lime was followed by treating the freshly broken surface with phenolphthalein. The complete air storage permitted most rapid carbonation, being nearly complete in 28 days, while the damp closet slowed it down greatly. The putty specimens showed a sharp line between carbonated and uncarbonated zones, much more so than with the hydrated limes. It was very evident that the carbonation itself did not necessarily produce the strength, for other factors, including presence of moisture, are involved. The presence of the latter seems to be quite important if the calcite crystals formed are to build up so as to have a cementing action.

The rate of hardening during the first three days was followed by noting the depth to which a cone carrying a load of 1200 grams would sink. After 22 and 46 hours the penetration had reduced to about 37 and 10% of initial value, while at 70 hours the penetration was almost negligible. The yield of putty mortar was slightly greater than the others, 704 as compared with 690 and 688, by virtue of the greater water content. —*Tonindustrie Zeitung* (1934) 58, No. 5, p. 47; No. 6, p. 62.

Publications

Pavements Resurfaced with Concrete.—Portland Cement Association, Chicago, Ill., has issued a 20-p. booklet which should prove helpful to all producers of cement and aggregates on the methods used for resurfacing old pavements.

Concrete Road Design.—Portland Cement Association, Chicago, Ill., has published a 62-p. booklet by Frank T. Sheets, consulting engineer, former state highway engineer of Illinois, that should be helpful to all producers selling material for concrete roads. It is designed to show how concrete can be adopted to use on highways with light traffic requirements as well as heavy duty pavements.

Pennsylvania Highway Department to Weigh All Aggregates

WEIGHING of all materials purchased by the Pennsylvania Department of Highways will be supervised by a special officer. In 1932 the Department of Highways began to test platform scales on which materials consigned to the department were weighed. For this purpose two trucks were equipped with standard weights and other necessary apparatus. The first check-up, which carried over into 1933, disclosed that nearly half of the scales were inaccurate, and that about 70% of the inaccuracies represented loss to the department. Secretary Lewis ordered periodic tests of all devices used in weighing materials purchased for the department and stationed weigh-masters or inspectors at many quarries and plants from which material was being delivered, to check tonnages.

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	2-20-34	5	6	
Allentown P. C., pfd.[47]	2-20-34	6	8	
Alpha P. C., com	3-25-34	15⅛	16	
Alpha P. C., pfd	1- 2-34	75	....	$1.75 qu. Mar. 15, '34
Amalgamated Phos. 6's, '36[47]	2-20-34	95	98	
American Aggregates, com.[47]	3-23-34	1¼ F	4½ F	
American Aggregates, pfd.[47]	3-23-34	15½	20½	
American Aggregates 6's, 1st mtg. 3/6's, 1943, new	3-23-34	32	38	
American Aggs., 6's, 1943, old	3-23-34	31 F	41 F	
American L. and S., 1st 7's[47]	2-20-34	71	75	
Arundel Corp., com.[47]	2-20-34	22	25	25c qu. Jan. 2, '34
Bessemer L. and C., Class A[47]	2-20-34	3	5	
Bessemer L. and C., 1st 6½'s, 1947	3-13-34	19	....	
Bessemer L. and C., cert. of dep., 1947	3-13-34	18	....	
Bloomington Limestone 6's[47]	2-20-34	8	10	
Boston S. and G., new com.[37]	3-10-34	1	2	
Boston S. and G., new 7% pfd.[37]	3-10-34	5	10	
Boston S. and G., 7's, 1934[37]	3-10-34	40	50	
California Art Tile, A[9]	3-12-34	1	2	
California Art Tile, B[9]	3-12-34	....	½	
Calaveras Cement, com	3-15-34	½	2	
Calaveras Cement, 7% pfd	3-15-34	47½	75	1.75 qu. Jan. 15, '34
Canada Cement, com	3-19-34	11¾	actual sale	
Canada Cement, pfd	3-19-34	50	actual sale	
Canada Cement, 5½s, 1947	3-20-34	86½	88½	
Canada Crushed Stone bonds[42]	3-10-34	65	....	
Canada Crushed Stone, com.[42]	3-10-34	5	....	
Certainteed Products, com	3-25-34	5¾	6	
Certainteed Products, pfd	3-25-34	23	26	
Certainteed Products, 5½s, '48	3-25-34	65½	actual sale	
Cleveland Quarries	1-30-24	....	25	
Consol. Cement, 1st 6½'s, 1941	3-13-34	17	20	
Consolidated Cement, pfd.[47]	2-20-34	1	2	
Consolidated Oka S. and G. (Canada) 6½s[12]	10-13-33	....	20	
Consolidated Oka S. and G. (Canada), pfd.[12]	10-13-33	No market		
Consol. Rock Prod., com[47]	2-20-34	½	1	
Consol. Rock Prod., pfd.[47]	2-20-34	1	2	
Consol. Rock Prod., units[47]	2-20-34	2	3	
Consol. S. and G., pfd. (Can.)	10-13-33	No market		
Construction Mat., com.[47]	2-20-34	1	2	
Construction Mat., pfd.[47]	2-20-34	2	4	
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[46]	2-27-34	24	....	
Coosa P. C., 1st 6's[47]	2-20-34	10	15	
Coplay Cement Mfg., pfd.[47]	2-20-34	5	7	
Coplay Cement Mfg., 6's, '41[47]	2-20-34	40	45	
Dewey P. C., com.[47]	3-26-34	60	75	
Dolese and Shepard	3-25-34	11½	13½	
Dufferin Pav. & Cr. Stone, com.	3-19-34	2¾	actual sale	
Dufferin Pav. & Cr. Stone, pfd.	3-19-34	35	actual sale	
Edison P. C., com.[47]	2-20-34	1	3	
Edison P. C., pfd.[47]	2-20-34	4	6	
Federal P. C. 6½'s, 1941[47]	2-20-34	30	33	
Florida Port. Cement 6½'s, '37	3-23-34	63½	67	
Giant P. C., com.[47]	2-20-34	1½	3	
Giant P. C., pfd.[47]	3-26-34	15	20	
Gyp. Lime & Alabastine, Ltd.	3-19-34	7¼	actual sale	
Gyp. Lime & Alabastine 5½'s, 1948	3-20-34	78	81	
Hermitage Cement, com.[47]	2-20-34	10	15	
Hermitage Cement, pfd.[47]	2-20-34	35	40	
Ideal Cement 5's, 1943[47]	2-20-34	99	101	
Ideal Cement, com	3-21-34	30¾	32½	25c qu. Apr. 2, '34
Indiana Limestone 6's[47]	2-20-34	12	15	
International Cement bonds, 5's, 1948	3-20-34	88	actual sale	Semi-annual int.
International Cement, com	3-25-34	30½	31	
Kelley Island L. and T.	3-25-34	11¾	12½	15c qu. Apr. 1, '34
Ky. Cons. Stone, 6½'s, 1933	2-24-34	5	6	
Ky. Cons. Stone, com.[47]	2-20-34	1	2	
Ky. Cons. Stone, pfd.[47]	2-20-34	....	5	
Ky. Cons. Stone, 7% pfd.[47]	2-20-34	....	5	
Ky. Cons. Stone, 1st Mtg., 6½'s[48]	3-26-34	8	....	
Ky. Cons. St. V. T. C.[47]	2-20-34	....	2	
Ky. Rock Asphalt, com	2-24-34	⅜	¾	
Ky. Rock Asphalt, pfd	2-24-34	6	8	
Ky. Rock Asphalt 6½'s, 1935	2-24-34	58	....	
Kentucky Stone, com	8-19-33	....	¼	
Kentucky Stone, pfd	8-19-33	....	10	
Lawrence P. C.	3-20-34	13	16	
Lawrence P. C., 5½'s, 1942[47]	2-20-34	65	70	
Lehigh P. C., com	3-23-34	15¼	16½	
Lehigh P. C., pfd	3-23-34	74⅛	76	87½c qu. Apr. 2, '34
Louisville Cement[47]	2-20-34	65	75	
Lyman-Richey 1st 6's, 1935[47]	2-20-34	85	90	
Marbelite Corp., com. (cement products)[47]	2-20-34	25c	40c	
Marbelite Corp., pfd.[47]	2-20-34	50c	....	
Marquette Cement, com.[47]	2-20-34	14	16	
Marquette Cement, pfd.[47]	2-20-34	46	50	
Marquette Cem. Mfg. 1st 5's, 1936[47]	2-20-34	70	75	
Marquette Cem. Mfg. 1st 6's, 1935[46]	3-26-34	96	....	
Material Service Corp.[47]	2-20-34	4	6	
McCrady-Rodgers, com.[47]	2-20-34	7	9	
McCrady-Rodgers, 7% pfd.[47]	2-20-34	35	40	
Medusa P. C., com.[47]	2-20-34	8	10	
Medusa P. C., pfd.[47]	2-20-34	35	40	
Michigan L. and C., com.[47]	2-20-34	60	65	
Missouri P. C	3-25-34	7	8	
Monarch Cement, com[47]	3-26-34	60	70	
Monolith P. C., com.[9]	3-12-34	1.30	1.60	
Monolith P. C., 8%, pfd.[9]	3-12-34	3½	4½	25c Mar. 10, '34
Monolith P. C. units[47]	3-26-34	8¼	....	
Monolith P. C. 1st Mtg. 6's[47]	3-12-34	70	80	
Monolith Portland, Midwest[47]	3-12-34	75½	78	
National Cem. (Can.), 1st 7's	10-13-33	No market		
National Gypsum A, com	3-25-34	6½	7	
National Gypsum, pfd	3-25-34	74	76	
National Gypsum 6's[47]	2-20-34	82	85	
National L. & S., 6½'s, 1941[47]	2-20-34	65	70	
Nazareth Cement, com.[47]	2-20-34	2	4	
Nazareth Cement, pfd.[47]	2-20-34	30	35	
Newaygo P. C., 1st 6½'s, 1938	3-23-34	43½	46	
New England Lime 6's, 1935	12-11-33	8	10	
N. Y. Trap Rock 1st 6's, 1946	3-25-34	55	actual sale	
N. Y. Trap Rock, 7% pfd.[47]	2-20-34	65	70	
North Amer. Cement 1st 6½'s[47]	2-20-34	25	30	
North Amer. Cement, com.[47]	2-20-34	1	2	
North Amer. Cement, 7% pfd.[47]	2-20-34	3	5	
North Shore Mat. 1st 6's[47]	2-20-34	40	45	
Northwestern States P. C.	3-23-34	45	....	1.50 Jan. 2, '34
Northwestern Port. Cem. units	12-19-33	28	32	
Ohio River S. and G., com	2-24-34	....	5	
Ohio River S. and G., 1st pfd.	2-24-34	....	50	
Ohio River S. and G., 2d pfd.	2-24-34	20	....	
Ohio River S. and G., 6's[47]	2-20-34	10	12	
Oregon P. C., com.[47]	2-20-34	12	15	
Oregon P. C., pfd.[47]	2-20-34	65	70	
Pacific Coast Aggr., com.[40]	3-21-34	....	15c	
Pacific Coast Aggr., pfd.[40]	3-21-34	5c	25c	
Pac. Coast Aggr., 6½'s, '44[40]	2-21-34	16 F	18 F	
Pacific Coast Aggrs., 7's, '39[40]	3-21-34	2 F	4 F	
Pacific Coast Cement 6's, 1937[47]	2-20-34	45	50	
Pacific P. C., com.[47]	2-20-34	6	8	
Pacific P. C., pfd.[46]	3-26-34	30	....	
Pacific P. C. 6's, 1935[47]	2-20-34	95	98	
Pacific P. C., 6½'s, pfd.[40]	3-21-34	30	35	
Peerless Cement, com.[47]	2-20-34	¼	¾	
Peerless Cement, pfd.[47]	2-20-34	1	2	
Penn.-Dixie Cement, com	3-25-34	6⅛	6¼	
Penn.-Dixie Cement, pfd	3-23-34	24	26	
Penn.-Dixie Cement, 6's A, '41	3-20-34	70¾	actual sale	
Penn. Glass Sand Corp., pfd.[47]	2-20-34	70	75	1.75 Apr. 1, '34
Penn. Glass Sand Corp., 6's[47]	2-20-34	95	98	
Petoskey P. C., 6's, 1941[47]	2-20-34	42	45	
Petoskey P. C., 6's, 1935-38	3-13-34	43	48	
Petoskey P. C.	3-23-34	1¼	2	
Phosphate Mining Co. (N. Y.), com.	12-19-33	No market		
Port Stockton Cem., com	3-12-34	No market		
Republic P. C., 6's, 1943[47]	2-20-34	66	70	
Riverside Cement, A[47]	2-20-34	10	13	47½c Feb. 1, '34
Riverside Cement, B[47]	2-20-34	2	3	
Riverside-Cement, pfd.[47]	2-20-34	75	80	1.50 qu. Feb. 1, '34
Rockland and Rockport Lime, 1st pfd.[47]	2-20-34	2	3	
Sandusky Cement 6's[47]	2-20-34	35	40	
Sandusky Cement 6½'s, 1932-1937[47]	2-20-34	40	45	
Santa Cruz P. C., com.[47]	2-20-34	60	65	1.00 qu. Jan. 2, '34
Schumacher Wallboard, com.[47]	2-20-34	1	3	
Schumacher Wallboard, pfd.[47]	2-20-34	12	15	
Signal Mt. P. C., pfd.[47]	2-20-34	12	16	
Signal Mt. P. C. 6's, '36	3-23-34	84½	86½	
Southwestern P. C., units[47]	2-20-34	175	200	
Southwestern P. C., com.[46]	2-20 34	30	35	
Southwestern P. C., pfd.[47]	2-20-34	80	90	
Standard Paving & Mat. (Canada), com	3-19-34	3½	actual sale	
Standard Paving & Mat., pfd.	3-19-34	23	actual sale	
Superior P. C., A[47]	2-20-34	20	22	55c Mar. 1, '34
Superior P. C., B[47]	2-20-34	7	9	
Trinity P. C., units[47]	2-20-34	30	35	
Trinity P. C., com.[47]	2-20-34	5	10	
Trinity P. C., pfd.[47]	2-20-34	25	30	
U. S. Gypsum, com	3-25-34	39	39½	25c qu. Apr. 2, '34
U. S. Gypsum, pfd	3-23-34	122¼	124	1.75 qu. Apr. 2, '34
Wabash P. C.[47]	2-20-34	5	6	
Warner Co., w.w., 1st 6's	3-16-34	20	40½	
Warner Co., ex.w., 1st 6's	3-16-34	20	30	
Warner Co., com. (sold at auction Philadelphia)	3- 7-34	2½	actual sale	
Warner Co., pfd. (sold at auction, Philadelphia)	3- 7-34	7½	actual sale	
Whitehall Cem. Mfg., com.[47]	3-26-34	35	40	
Whitehall Cem. Mfg., pfd.[47]	3-26-34	45	50	
Wisconsin L. & C., 1st 6's, '33[47]	2-20-34	85	90	
Wisconsin L. & C. 6½'s[47]	2-20-34	85	90	
Wolverine P. C., com.[47]	2-20-34	2	3	
Yosemite P. C., A, com	3-12-34	1½	2⅛	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [14]First Wisconsin Co., Milwaukee, Wis. [37]Wise, Hobbs & Arnold, Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thompson & Co., Toronto. [46]First Union Trust & Savings Bank, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill.

F—Flat.

Recent Dividends Announced

Alpha Portland Cement 7% pfd. (qu.)	$1.75	March 15,	1934
Ideal Cement Co., com. (qu.)	.25	April 2.	1934
Kelly Island Lime and Transport (qu.)	.15	April 1,	1934
Monolith Portland Cement 8% pfd. (accumulative)	.25	March 10,	1934
Pennsylvania Glass Sand Corp. 7% pfd.	1.75	April 1,	1934
Superior Port. Cem. A. (np)	.55	March 1,	1934
U. S. Gypsum Co., com. (qu.)	.25	April 2.	1934
U. S. Gypsum Co., pfd. (qu.)	1.75	April 2.	1934

Canada Cement Co., Ltd.: Annual report for the fiscal year ending November 30, 1933, states:

The volume of building, including engineering projects, according to published statistics, fell to a lower level in Canada in 1933 than in any year since 1915, but due also to the lack of purchasing power of the farmer and small user, the demand for cement was less than in any year since 1906. However, the extreme low point of the decline in cement consumption would appear to have been reached in February, 1933. After that month the decline, while still very severe, was of less intensity each month thereafter until October when, for the first time in practically three years, there was a cessation of the downward trend. This held true of November which compared favorably with the previous year. Business generally in Canada has shown slow but steady improvement over a period of several months, and the prospects for construction work during the coming year are more favorable than at this time last year. There is reason for hope, therefore, that the company has passed through the worst of the depression period, and may look forward with some confidence to an increased volume of business.

The earnings for the year over and above bond interest were not sufficient to provide for the normal amount of depreciation which should be written off annually; therefore, only a small proportion of the necessary depreciation has been written off, namely, $250,000. Dividends on the preferred stock accrued during the year. The item of $600,000 purchase money obligations appearing on the previous statement has been paid off in full. Cash on hand has improved by some $300,000 and, on the other hand, inventories are reduced.

Miscellaneous income and interest on investments held up remarkably well. There was also some saving to the company in the latter half of the year over the previous year due to the drop in the premium on New York funds required for payment of bond interest. Idle plant expense due to the very restricted operating program was, on the other hand a heavy burden. The mills operated at only a small percentage of their capacity. No capital expenditures of any consequence were undertaken during the year but plant properties were well maintained and are in their usual good condition.

INCOME ACCOUNT, CANADA CEMENT CO., LTD.
(Years ended November 30)

(Canadian currency)	1933	1932
Operating profit	$1,486,740	$2,641,724
Depreciation	250,000	555,650
Balance	1,236,740	2,086,074
*Bond interest	1,077,115	1,155,743
Fire insurance reserve	.....	120,400
Extraordinary repairs, etc.	25,000	25,000
Contingent reserve	57,711	.....
Net income	76,914	784,931
Preferred dividends	.....	680,678
Surplus for year	76,914	104,253
Previous surplus	762,681	658,428
Surplus November 30	839,595	762,681
Times interest earned	1.15	1.80

*Includes premium on New York funds: 1933, $48,979; 1932, $102,995.

BALANCE SHEET OF CANADA CEMENT CO., LTD.
(As of November 30)

Assets:	1933	1932
*Property account	$39,287,696	$39,461,437
Reacquired bonds (par)	706,500	1,126,500
Investments	3,568,243	3,692,467
Current assets:		
Inventories	1,626,844	2,144,280
Cash	1,607,541	1,320,262
Accounts receivable, net	287,387	315,866
Deposits on tenders	6,103	9,302
Compensation deposits	75,440	75,440
Government and other securities	395,633	450,445
Deferred charges	100,873	76,945
Total	$47,662,261	$48,672,943
Liabilities:		
6½% preferred stock (par $100)	$20,086,900	$20,086,900
†Common stock and surplus	6,403,905	6,403,905
First 5½s, 1947	18,263,000	18,732,500
Purchase money obligations	‡	600,000
Current liabilities:		
Accounts payable	540,195	608,950
Interest accrued, etc.	109,765	103,891
Reserve for fire insurance	750,000	750,000
Reserve for contingencies	250,000	230,717
Other reserves	363,000	337,500
Preferred redemption reserve	55,900	55,900
Profit and loss surplus	839,595	762,681
Total	$47,662,261	$48,672,943
Current assets	$3,998,948	$4,315,595
Current liabilities	649,960	712,841
Working capital	3,348,988	3,602,754

*Less depreciation. †Represented by 600,000 no par shares. ‡Purchase money obligations of $600,000 have been paid off in full.

The deficit, per share of common stock, in 1933, was $2.05; in 1932, $0.87; in 1931, the earnings were $0.32, in 1930, $0.34, in 1929, $0.76. The last preferred stock dividend was paid June 30, 1932.

◆ ◆ ◆

United States Gypsum Co., Chicago, Ill.: ANNUAL REPORT of Sewell L. Avery, president, states:

The net income for the year ended December 31, 1933, was $1,738,926.98. This represents an earning of $1.00 per share on the common stock outstanding at the end of the year, after providing for the 7% dividend on the preferred stock. The corresponding earnings on the common stock for the previous year was $0.86 per share.

Cash dividends amounted to $1,735,484.00, of which $1,187,930.00 was paid to common stockholders and $547,554.00 to preferred stockholders.

Plant additions for the year amounted to $1,116,373.41, which includes the purchase of two roofing plants. On June 12 the company acquired the roofing plant of the McHenry-Millhouse Manufacturing Co., at South Bend, Indiana, and on August 21 the roofing plant of the SiFo Products Co., at St. Paul, Minnesota. In February of 1934 the company purchased the SiFo roofing plant at North Tonawanda, N. Y. The felt requirements of these three properties are such as to make production of felt an economic advantage, and to secure this the plant of Draycott Mills, Inc., at Skaneateles Falls, N. Y., for many years a producer of the highest quality of roofing felt, has been acquired.

Building activities of the kind which the company serves continue at low levels, although an improvement for the year 1934 appears to be a reasonable expectation.

Total assets are listed at $59,422,191 as of December 31, 1933, as against $59,896,369, December 31, 1933, plant and equipment having been written down approximately $1,000,000. Earned surplus was $19,585,811 in 1933, against $10,641,451 in 1932. Current assets were $19,672,122 in 1933 and $18,605,927 in 1932.

◆ ◆ ◆

Kelley Island Lime & Transport Co., Cleveland, Ohio, has declared a quarterly dividend of 15 cents, payable April 1 to stock of record March 24. Last disbursement was on January 2, 1933, when 25 cents was paid.

◆ ◆ ◆

International Cement Corp., New York City, has purchased 10,700 of its common stock shares on the stock market in recent months. **Lehigh Portlnd Cement Co.,** Allentown, Penna., has purchased 10,452 of its common stock shares. Attention was recently called in the financial press to the fact that a large number of strong companies were buying back their stock, evidently for resale under more prosperous conditions.

CONSOLIDATED BALANCE SHEET OF U. S. GYPSUM CO
(as of December 31)

	1933	1932
Operating profit	$ 3,202,885	$ 3,160,225
Other income	566,955	564,247
Total income	3,769,840	3,724,472
Depreciation and depletion	1,775,495	1,786,583
Federal taxes	96,740	61,327
Other deductions	158,678	277,146
Net income	1,738,927	1,599,416
Preferred dividends	547,553	547,552
Common dividends	1,187,930	1,903,828
Surplus for year	3,444	(d)851,964
Earned surplus, January 1	19,641,451	28,675,751
Canadian exchange adjustment (credit)	81,935	21,509
Surplus debits	*141.019	†8,203,845
Earned surplus, December 31	19,585,811	19,641,451
Times preferred dividends, earned	3.18	2.92

*Transfer to paid-in surplus (classification of surplus adjustment). †Includes $7,700,000 reduction in book value of certain plant assets and $503,845 losses on discontinued plants, patents and patent rights, bag inventory obsolescence, and cost of cancelling a long term lease.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of March 17:

New England

32165. To cancel rate of 5c per 100 lb. on **limestone,** crushed or ground, burnt or unburnt, Brandon, Leicester Jct., Middlebury, New Haven and Proctor, Vt., to Castleton and West Rutland, Vt., as shown in Sup. No. 3 to Rutland I. C. C. 6187, and apply in lieu thereof rate of 12c.

32196. **Rubble stone** (waste product of quarries, split and/or rough chipped into various sizes and shapes, without dimension), (See Note 3). E. Hartford, Conn., to Harlem River, N. Y. Present, 12; proposed, 11.

Trunk

32030. **Ground limestone,** C. L., minimum weight 50,000 lb., from Swatara and Annville, Pa., to Revloc, Pa., $2.20 per net ton.

32034. **Stone, viz., breakwater, quarry scrap,** C. L., (See Note 2), from West Ellwood Jct. and Ellwood City, Pa., to Buffalo, N. Y., $1.40 per net ton.

32035. **Limestone, crushed, ground or pulverized,** C. L., minimum weight 60,000 lb., from Rocky Point, Va., to N. Y. C. R. R. stations, viz., Glasgow, Cedar Grove, Monarch, Shrewsbury and Dickinson, W. Va., $2.39, and Belle, Malden and Dana, W. Va., $2.52 per net ton.

32042. To cancel commodity rate of 22½c per 100 lb. published in Item 195 of B. & O. I. C. C. 21564 on **marble chips and marble waste,** C. L. minimum weight 40,000 lb., from Cardiff, Md., to Stapleton, N. Y.

32078. **Limestone, ground or pulverized, and limestone dust,** C. L., minimum weight 50,000 lb., from Jordanville, N. Y., to D. L. & W. R. R. stations, Scranton, Pa., Oswego, Ithaca, Elmira, Avoca, Wayland, Lisle, McGraw, Coventry, Earlville, Paris, West Winfield, South Columbia, N. Y., and various. Rates ranging from 70c to $2 per net ton.

32127. **Crushed stone and screenings** (will not include agricultural limestone or ground limestone, unburned, or fluxing stone or firestone), C. L., (See Note 2), from Texas, Md., Campbell, York, Billmyer, Brainbridge, Union Stone Co., Pa., and Blue Mount, Md., to Hursley, Md., and Franklin City, Va., $1.60 per net ton.

32128. **Ground limestone,** C. L., minimum weight 50,000 lb., from Blakeslee, N. Y., to Erie R. R. stations Pine City to Seeley Creek, N. Y., inclusive, Blossburg, Pa., Wayland, Lakeville, Attica, Salamanca, N. Y., and various rates ranging from $1.60 to $2.35 per net ton.

Central

38875. To establish on **limestone, agricultural** (refuse lime); in bulk, in open top cars, C. L., from Milltown, Ind. Rates in cents per net ton.

To	Pres.	Prop.	Rt.
Nisbet, Ind.	190	110	1
Martin, Ind.	190	110	2
Armstrong, Ind.	180	110	2

1—Via Sou. Ry., Mt. Carmel, Ill., C. C. C. & St. L. Ry.

2—Via Sou. Ry., Browns, Ill., I. C. R. R.

39001. To establish on **stone, crushed** (in bulk) and **crushed stone screenings** (in bulk) in open top cars, C. L., from Genoa and Martin, O., to West Alliance, O., rate of 125c per N. T.

39002. To establish on **sand and gravel,** C. L., from Peru, Ind., to Lucerne, Ind., rate of 75c per N. T. Route—Via Wab. Ry., Logansport, Ind., P. R. R.

39006. To establish on **sand and gravel,** C. L., between P. R. R. (main line) points, Wheeling, W. Va., or Warwood, W. Va., and P. R. R. (terminal branch) points, Benwood, W. Va., Martins Ferry, Ohio, and Wheeling, W. Va., switching rate of 38c per gross ton, subject to minimum weight of 25 gross tons per car. Route—Via P. R. R. direct.

38913. To establish on **crushed stone and crushed stone screenings,** in open top cars, C. L., from Bridgeport, O., to W. & L. E. Ry. stations shown below, rates in cents per net ton except as noted:

To	Prop.	*Pres.
Steubenville, O.	50	10
Mingo Jct., O.	50	9
Brilliant, O.	50	9
Warrenton, O.	50	9
Rush Run, O.	50	9
Tiltonville, O.	50	9
Yorkville, O.	50	9
Connor, O.	50	9
Dillonvale, O.	50	9
Mt. Pleasant, O.	50	10
Herrick, O.	50	10
Adena, O.	50	10
Unionvale, O.	60	11
Jewett, O.	60	11
Scio, O.	80	12
Conotton, O.	80	12
Bowerston, O.	85	12
Neffs, O.	50	9
St. Clairsville, O.	60	9
Clarkson, O.	60	10
Harrisville, O.	60	10

*Class rates in cents per cwt.

38997. To establish on **stone, rough** (not dimension), rubble, rip rap, and quarry scrap, C. L., from Sugar Grove, O., to points in New York, Illinois, Indiana, Michigan, West Virginia, Pennsylvania and Ohio, rates as shown in Exhibit A. Present, as shown in Exhibit A below.

EXHIBIT A

[Proposed rates in cents per net ton.]

To	(1)	*(2)	(3)	*(4)
Buffalo, N. Y.	318	26	290	25
Chicago, Ill.	318	26	315	25
Fort Wayne, Ind.	214	20	239	20
Grand Rapids, Mich.	290	25	315	25
Huntington, W. Va.	176	‡202	176	18
Huntington, W. Va.	...	18	...	..
Lansing, Mich.	265	23	302	23
Oil City, Pa.	277	23	277	23
Portsmouth, O.	139	15	139	16
Richmond, Ind.	189	18	189	18
Sandusky, O.	176	18	202	18
Wheeling, W. Va.	202	19	189	17
Pittsburgh, Pa.	214	21	...	..

(1) From Sugar Grove, O., proposed rates.
(2) From Sugar Grove, O., present rates, sixth class.
*Rates in cents per 100 pounds.
(3) From Harvest Hill, O., White Docket Advice 38566, proposed rates.
(4) From Harvest Hill, O., White Docket Advice 38566, present rates, sixth class.
‡Present rate when via C. & O. Ry. direct is 202 cents net ton, distance 175.9 miles.

39000. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and gravel, in open top equipment, carload, from Ashtabula and Ashtabula Harbor, O.

To	Prop. N. T.	Pres. Cwt.
Ifield, Pa.	170	21
Republic, Pa.	160	20
West Liberty, Pa.	130	17
Castle Shannon, Pa.	140	17
Bennicoll, Pa.	140	17
Coverdale, Pa.	140	17
Horning, Pa.	140	17
Bruceton, Pa.	140	17
Clairton, Pa.	140	17
Donora (Baird), Pa.	150	18
Connellsville, Pa.	160	19
Avella, Pa.	150	18

39028. To establish on **stone,** viz., rip rap and rubble, C. L., actual weight will apply, from Chicago, Ill. Rates in cents per net ton:

To	Route	Present	Proposed
Albion, Mich.	*	400	202
Battle Creek, Mich.	*	360	189
Cadillac, Mich.	†	480	252
Kalamazoo, Mich.	*	360	176
So. Haven, Mich.	*	340	176
Sturgis, Mich.	‡	360	176
Ypsilanti, Mich.	*	440	239

*M. C. R. R.
†M. C. R. R., Kalamazoo, and P. R. R.
‡M. C. R. R., Porter, Ind., and N. Y. C. R. R.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Notoe 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

39048. To establish on **stone, crushed, slag and/or gravel,** coated with oil, tar or asphaltum (see note, in open top equipment, C. L., from Bridgeport, O., to points in West Virginia, Pennsylvania and Maryland, rates as shown in Exhibit A. Note—The oil, tar and/or asphaltum not to exceed 10 per cent by weight of the commodity as shipped, the shipper to so certify on shipping orders and bills of lading.

EXHIBIT A

(Rates in cents per 2,000 pounds.)

To Representative Points	Proposed	Present
Moundsville, W. Va.	70	96
Woodland, W. Va.	80	96
New Martinsville, W. Va.	90	107
Sistersville, W. Va.	100	119
St. Marys, W. Va.	110	130
Parkersburg, W. Va.	120	142
Murrayville, W. Va.	130	153
Ravenswood, W. Va.	140	176
Mason City, W. Va.	150	188
Apple Grove, W. Va.	160	199
Kenova, W. Va.	170	211
West Alexander, Pa.	80	96
Washington, Pa.	100	119
Glen Easton, W. Va.	80	96
Burton, W. Va.	100	119
Fairmont, W. Va.	110	142
Grafton, W. Va.	120	142
Pine Grove, W. Va.	100	119
Salem, W. Va.	130	153
Clarksburg, W. Va.	120	142
Bridgeport, W. Va.	130	153
Weston, W. Va.	130	153
Orlando, W. Va.	140	176
Flatwoods, W. Va.	150	188
Allingdale, W. Va.	170	211
Gaston, W. Va.	140	176
Alexander, W. Va.	150	188
Philippi, W. Va.	130	153
Century Jct., W. Va.	140	176
Century, W. Va.	140	176
Falling Rock, W. Va.	180	222
Dundon, W. Va.	170	211
Walkersville, W. Va.	150	188
Adrian Jct., W. Va.	140	176
Midvale, W. Va.	150	188
Hardman, W. Va.	130	153
Rowlesburg, W. Va.	140	176
Masontown, W. Va.	130	153
Terra Alta, W. Va.	140	176
Hutton, Md.	140	176
Mt. Lake Park, Md.	150	188
Keyser, W. Va.	160	199

Route: B. & O. R. R. direct.

39046. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), or gravel, C. L., from Mantua, O., to Sharon, Pa., rate of 80c per net ton.

39049. To establish on **common sand and gravel,** in open top cars, C. L., from Lodi, O. Rates in cents per net ton except as noted.

To	Proposed	*Present.
Fremont, O.	90	13
Clyde, O.	85	12
Bellevue, O.	85	12
Monroeville, O.	60	11
Norwalk, O.	60	11
Milan, O.	80	12
Huron, O.	85	12
Hartland, O.	60	11
Clarksfield, O.	60	11
White Fox, O.	50	11
Brighton, O.	50	11
Wellington, O.	40	9
Spencer, O.	40	9
Pawnee, O.	50	9
Burbank Spur, O.	40	9
Creston, O.	40	9
Smithville, O.	50	10
Pryor, O.	50	10
Orrville, O.	50	10

*Sixth class, in cents per 100 pounds.

39054. To establish on **sand and gravel,** C.L., from Marion and Richwood, O., to Marysville, O., rate of 70c per net ton via Erie R. R., Peoria, O., N. Y. C. R. R.

39029. To establish on **rubble stone,** C. L., from Lehigh, Ill., to Toledo, O., and Detroit, Mich., rate of 196c per N. T.

39035. To establish on **sand** (other than blast, core, engine, filter, fibre or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and gravel, C. L., from Chicago and Joliet, Ill., to points in the state of Michigan, rates as shown in Exhibit A.

EXHIBIT A

To (rep. pts.)	Present	Proposed
Grand Trunk Ry.		
Battle Creek, Mich.	161	125
Cassopolis, Mich.	138	120
Penn, Mich.	138	120
Schoolcraft, Mich.	138	120
Scotts, Mich.	161	125
Vicksburg, Mich.	138	120
Michigan Central R. R.		

Battle Creek, Mich.	161	125
Dowagiac, Mich.	138	120
Kalamazo, Mich.	138	120
New York Central R. R.		
Kalamazoo, Mich.	138	120
Schoolcraft, Mich.	138	120
Three Rivers, Mich.	138	120
Pere Marquette R. R.		
Allegan, Mich.	147	135
Bangor, Mich.	138	135
Colona, Mich.	132	120
Dunning, Mich.	147	135
Fillmore, Mich.	147	135
Glen Lord, Mich.	115	101
Grand Rapids, Mich.	161	135
Hartford, Mich.	132	120
Holland, Mich.	138	135
Hudsonville, Mich.	161	135
Jenison, Mich.	161	135
Mill Grove, Mich.	147	135
Riverside, Mich.	126	120
Veneklassen, Mich.	161	135
Watervliet, Mich.	132	120

Southern

4267. **Sand,** C. L., Kingstree, S. C., to Charleston and Huntington, W. Va. It is proposed to establish reduced rate on sand (not powdered or pulverized to such fineness that 90% or more will pass through a No. 100 (100 openings to the inch) mesh screen, (See Note 3), from and to above named points, 305c per net ton.

4293. **Stone,** crushed, C. L., Trent, Va., to L. & N. R. R. stations (Baxter, Ky., to Dione, Ky., inclusive). It is proposed to establish reduced rate (See Note 3), from and to the above named points, 60c per net ton (to expire July 31, 1934, unless sooner canceled, changed or extended).

4392. **Rock, bituminous,** crushed or ground, C. L., Big Clifty, Black Rock, Bowling Green, Garfield, Rockport and Summit, Ky., to Jackson, Ky. It is proposed to establish rate on bituminous rock, crushed or ground, C. L., min. wt. 80,000 lb., except when for carriers' convenience car of less capacity is furnished, in which event marked capacity of car, but not less than actual weight will govern (in such instances bills of lading and way-bills should carry certificate over agents' signature, "car of greater capacity not available"), but in no case less than 50,000 lb., the minimum weight to be charged for on each car when the actual amount is less, from and to the aforementioned points, 240c per net ton. Proposed in order to place Jackson, Ky., on the proper basis (advance).

4393. **Limestone,** ground or pulverized, C. L., Dugan, Ky., to Indianapolis and Fort Wayne, Ind. At present, combination rates apply. It is proposed to establish reduced rates on limestone, ground or pulverized, C. L., minimum weight 60,000 lb., from Dugan, Ky., to Indianapolis, Ind., 237; Fort Wayne, Ind., 275c per net ton.

4450. **Sand,** C. L., Millington, Oregon, Ottawa, Utica, and Wedron, Ill., to Columbus, Miss. It is proposed to establish rate on sand, C. L., as published in Item 4670 of Agent Jones' I. C. C. 2675, from and to the aforementioned points, $3.34 per net ton.

Southwestern

2934. **Sand, silica, pumice and volcanic ash,** from Porter and Tullahassee, Okla., to Chicago, Ill., Madison, Wis., and Milwaukee, Wis. To establish rate of 23c per 100 lb. on sand, silica, pumice, volcanic ash, in straight or mixed carloads, (See Note 1), but not less than 10,000 lb., except where car of less than 60,000 lb. capacity is furnished at carriers' convenience marked capacity of car will apply, from Porter and Tullahassee, Okla., to Chicago, Ill., Madison, Wis., and Milwaukee, Wis.

2968. **Chatt (mine gravel),** from Picher, Okla., to Pryor, Okla. To establish rate of 79c per ton of 2,000 lb. on chatt, C. L., from Picher to Pryor, Okla.

3024. **Limestone, crushed or ground,** from Carthage, Mo., to Colorado points. To establish from Carthage, Mo., rates per net ton of 300c to Pueblo, Colo., and 350c to Colorado Springs, Denver, Boulder, Greeley and Ft. Collins, Colo., on crushed or ground limestone as described in Item 3590, W. T. L. Tariff 111-H, to meet competition from local and nearby production.

Illinois

5502-S-1. **Sand,** viz., lake, river and bank other than sand loam, Calumet, Gary and Willow Creek, Ind., to Casey, Ill. Present, class; proposed, $1.70 net ton.

7532-A. **Limestone rock,** C. L., in open top cars, (See Note 1), but not less than 100,000 lb., Dallas City, Ill., to Joliet, Ill. Present—$1.50 ton; proposed—$1.25 ton.

7100-S-114. **Sand, gravel, stone,** all kinds, gannister, quarry scrap or stripping, C. L., from Joliet, Ill., and points commonly grouped with Joliet, viz.: Lemont, Lockport, Millsdale and Romeo, Ill., to Waverly, Ill. Present—On stone, all kinds, quarry scrap or strippings rate $1.13 ton. Proposed—$1.01 ton to apply on all commodities named above.

Texas-Louisiana

8177-4. **Sand,** C. L., from Fredericksburg and Pedernales, Tex., to San Antonio, Tex.; Proposition from shippers to establish rate 68c per ton of 2,000 lb. to expire June 30, 1934.

Note: Rate only applies to San Antonio proper—if delivery is made on tracks of lines other than T. & N. O. the switching charge of such other lines shall not be absorbed, but shall be in addition to the rate. Shippers call attention to rate of 68c in effect from West Point and Smithville, Texas, and have asked for the same rate from Fredericksburg, Texas.

Western

7283. **Gravel** or **gravel pit strippings,** straight carloads (See Note 2), but not less than 60,000 lb., except when car is loaded to full visible or space carrying capacity, in which case actual weight will govern, from Pacific, Mo., to Lowell, Ind.

I. C. C. Decisions

15294. Silica sand. By division 2. Authority granted on conditions to establish and maintain rates on silica sand, C. L., from Illinois and Wisconsin points to destinations in the Southwest without observing the long-and-short-haul provision of section 4 of the Interstate Commerce Act.

22020. Cement. By division 4. Iola Cement Mills Traffic Association et al., vs. Atchison, Topeka and Santa Fe Railway company. Their rates on cement from Dewey, Okla., and points in the Kansas gas belt to certain Wyoming and Colorado points, found not unreasonable but unduly prejudicial and preferential in relation to rates from Portland and Boettcher, Colo., and Laramie, Wyo., to the same destinations—except for Denver, Colo., and points within 80 miles of the preferred points. Non-prejudicial rates prescribed.

Proposed I. C. C. Decisions

25156. Aggregate. Basic Dolomite, Inc., et al., vs. Ann Arbor Railroad. By Examiner Myron Witters. Reduced intrastate rates to Detroit, granted to meet water and truck competition and protested by Ohio shippers, tentatively approved. Mere existence of disparity between intrastate and interstate rates held not sufficient to warrant finding of undue prejudice. Evidence reported not to include data showing that there is an actual traffic from Ohio points to Detroit in competition with the intrastate shipments specified.

Slag Rate Lowered

EXAMINER E. E. GLENN, for the Interstate Commerce Commission, recommended in March that the commission officially recognize the claim of the Birmingham Slag Co., Birmingham, Ala., which has petitioned for a rate of $1.65 per ton on slag shipments from Ensley and Woodward, Ala., to Walhalla, S. C. In its petition the slag company declared that the Blue Ridge and the Southern Railway were charging 10c a ton more than was justified.

Cement Rates Hold

THE CALIFORNIA Supreme Court has refused to review the case of the Santa Fe, Union Pacific and Southern Pacific railroads against the California Railroad Commission. The railroad rate body recently ordered rates reduced on cement between Crestmore, Colton, Monolith and Victorville to points beyond Ventura and Ravenna. Thereupon the three railroads began litigation which ended in the order referred to from the supreme court of the state.

Low Intrastate Rate

EFFECTIVE UNTIL 1935, a new tariff covering sand and gravel shipments in Kansas is expected to save contractors and those in charge of CWA projects approximately one-third of the haulage charges which would have been collected under the old rate.

The new rate is 40 cents for 20 miles single line, and 55 cents joint line, against the old charge of 56 and 71 cents. The reduction, applicable on chat, slag, clay, stone and cinders as well as on sand and gravel, is less in all cases on longer distances within the state.

Sand-Lime Brick Production and Shipments in February, 1934

THE following data are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Ten sand-lime brick plants reported for the month of February this number being the same as the number reporting for the month of January, 1934, statistics for which were published February 25:

Average Prices for February

Shipping point	Plant price	Delivered
Madison, Wis.	$11.00	$12.50
Saginaw, Mich.	10.00	.....
Syracuse, N. Y.	18.00	20.00
Mishawaka, Ind.	8.50	.....
Grand Rapids, Mich.	.....	12.00
Toronto, Ont., Can.	12.00	13.50

Statistics for January and February

	†January	*February
Production	966,610	358,800
Shipments (rail)	16,000	54,000
Shipments (truck)	790,735	365,840
Stocks on hand	2,213,223	2,042,173
Unfilled orders	100,000	900,000

†Ten plants reporting; incomplete, four not reporting unfilled orders.

*Ten plants reporting; incomplete, four not reporting unfilled orders.

Hints and Helps for Superintendents

Stud Nut Utility

By C. H. Wright
Snyder, N. Y.

A STUD NUT for the machine shop is a simple but handy little tool to have around. Suppose you want to make, for example, a ¾-in. stud bolt 2 in. long. It is a simple matter to take the dies and cut the shorter thread on the stud by holding the stud in the bench vise, but to cut the thread on the other end without damaging the first thread by clamping it in the vise, it is preferable to have a ¾-in. stud nut. This can be made as follows:

Take a piece of 1¼-in. hexagon cold rolled steel 12 in. long, and drill a 19/32-in. hole straight through the center, tapping it out to ¾-in. Then with a ¾-in. set screw 2 in. long, and a ¾-in. hexagon nut, hold the set screw from turning out when the thread is being cut on the stud bolt. This tool may always be used when screwing a stud into a casting. It will never damage the thread and can easily be removed from the stud after the latter is screwed into the casting as far as it will go.

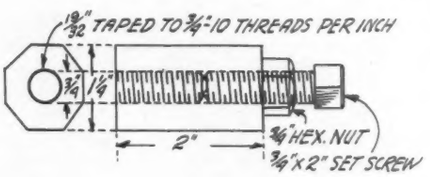
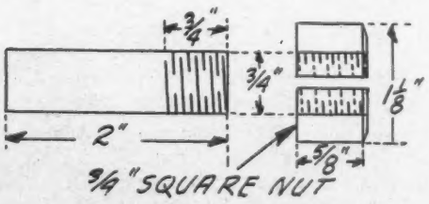


Diagram of stud nut

Too frequently, large wrenches are used for screwing a stud into a casting or for tightening up the nut on the stud. This not only spoils the nut for the wrench that was made to fit it, but also damages the wrench teeth.

Square Nut

Another little item that may be worked in conjunction with the stud nut, and which is very handy to have around to hold a stud in the vise for the purpose of renewing the thread, is a square sawed nut. Take a square nut that corresponds with the stud of the same diameter and number of threads per inch, hack-saw it into two parts and fit both parts onto the stud and clamp in the vise. It is well to have every size of square nut sawed this way, ready for use.



Section of sawed square nut

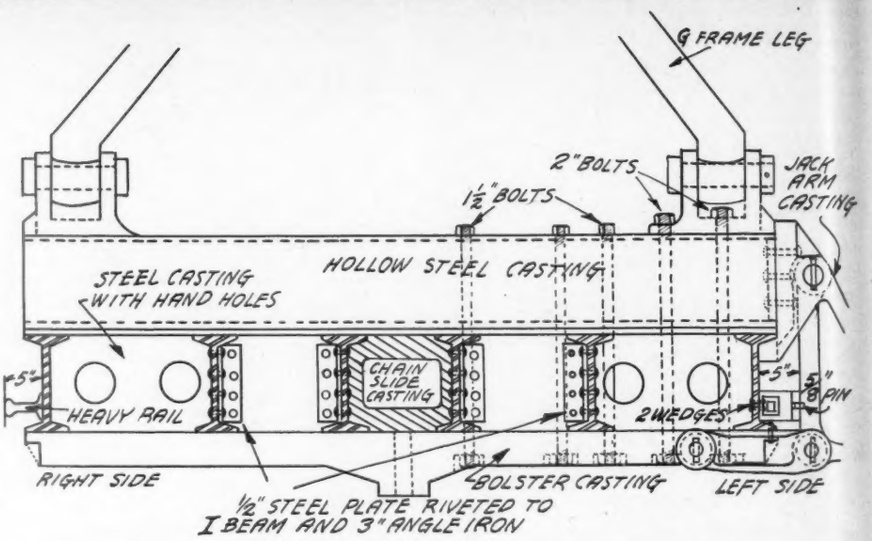
Oiling System for Jaw Crusher

By Dare Paris
Monrovia, Calif.

WHEN there are two drive belts used on a jaw crusher it is often times difficult and very dangerous for the oiler to fill the grease cups and screw them down, which is required several times a day. It is not only dangerous to the man oiling, but in such places the bearings are neglected and many times ruined.

Hazard Eliminated

In the accompanying illustration is shown a means of eliminating this danger to man and equipment by placing the oiling system up in a convenient place. Four grease guns are made of 3-in. pipe 12 in. long and threaded on both ends. A cap is screwed on each end. A hole is drilled in the bottom cap to take the size nipple required in the bearing. Note the four rods with handles extending above the floor. The rods are threaded 14 in. up. One iron washer and one leather washer are cut and fastened on the end of the rod. The leather washer, or one cut from rubber belting, should be the same size as the pipe. As the rods are screwed down the grease is forced out into the bearing. A piece of rubber hose is used to couple on to the eccentric.

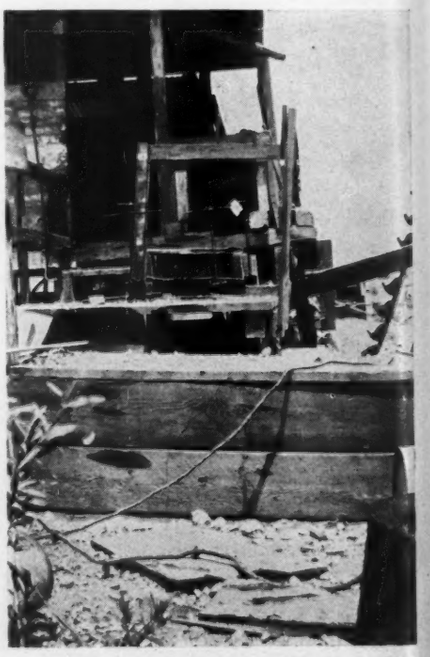


Auxiliary support to prevent breaking of vertical bolts through shovel foundation casting

Shovel Base Repair

By C. H. Wright
Snyder, N. Y.

ONE TROUBLESOME PROBLEM confronting the superintendent of an eastern plant was in connection with the base structure of large shovel equipment. Until the situation was remedied, as shown in the accompanying diagrams, serious production



Safety oiling installation

losses were encountered. The four 15-in. I-beams serving as the foundation of the shovels would break about 6 in. back of the forward end of the shovel under the casting supporting the frame A. The two 15-in. outside I-beams also would break where the main casting of the creepers fastened to the I-beam at the top.

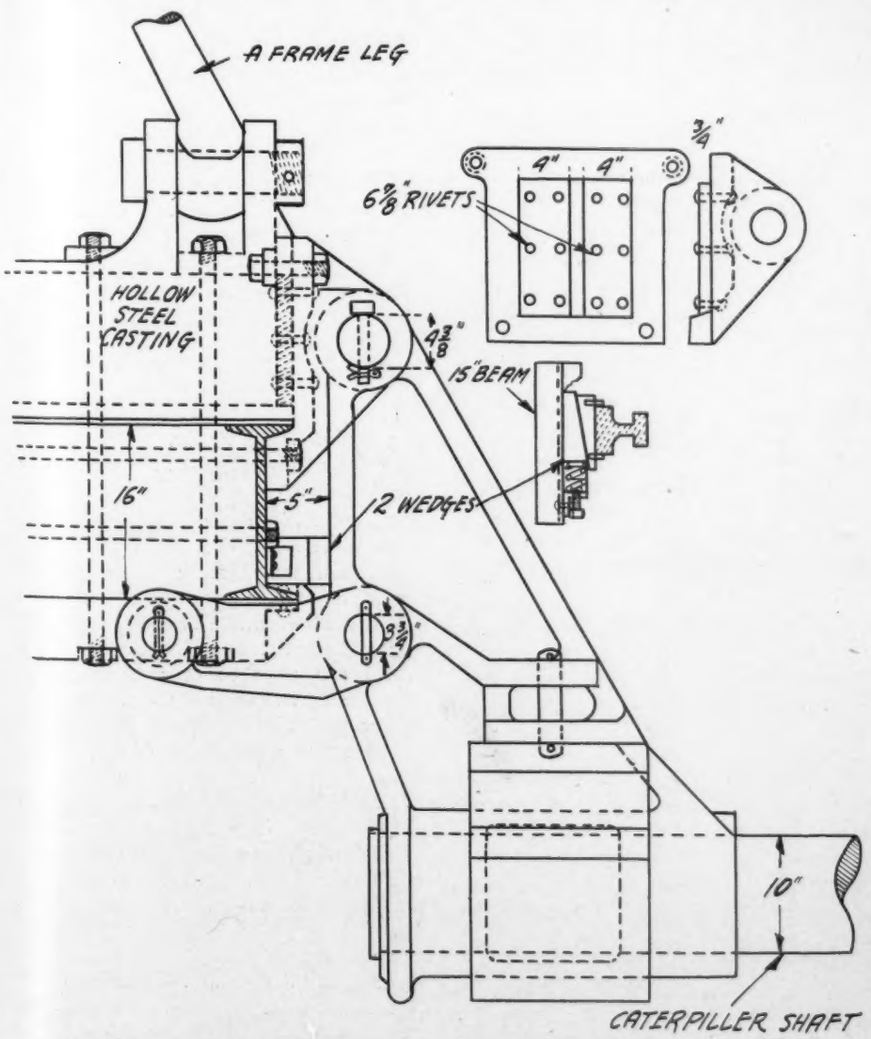
Originally, all that supported the upward stress of this casting and the weight of the shovel was the top flange of the I-beam and two 1½ in. by 10 ft. 2 in. bolts and two 1-in. bolts at the top of the casting.

Notice in the sketch that the frame casting is hollow and at each end where the creeper lug casting fits up against it there are two oblong holes. Two ¾-in. plates were fitted into these holes and riveted to the creeper lug casting with six ⅞-in. rivets in each plate.

After creepers had been installed, the shovel tended to work sideways on the bolster casting that fastens to the creeper jack arm casting. Through the bolster casting are eight 2 by 39-in. bolts and twelve 1½ by 36-in. bolts, piercing the flanges of the I-beams, the deck plate and the frame casting. (Imagine what a job it was to replace these bolts on Sunday with no steam on the shovel to swing the boom from one side to the other in order to get the holes lined up so that new bolts could be put in.) One year there were 48 1½ by 36-in. bolts and twelve 2 by 39-in. bolts put in.

Then two pieces of rail (measuring from top of ball to bottom of flange just 5 in.) were placed one on each side of the shovel between the 15-in. I-beam and the jack arm casting of the creeper. These helped considerably, but this arrangement was greatly improved by installing, as the sketch shows, two long tapered wedges with a heavy open spring at the large end of the one that moves on the I-beam, supported by a 3 by 3-in. angle iron with a set screw in the angle to tighten up on the spring as the slack required.

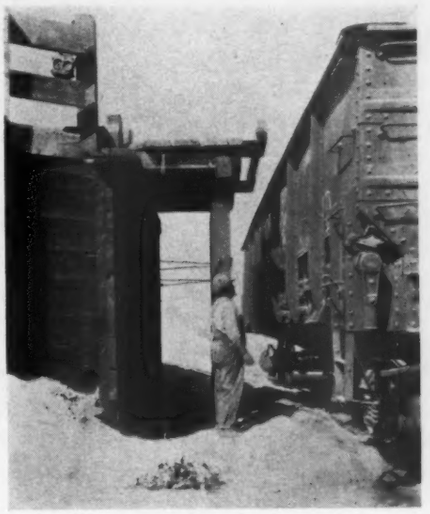
The sketch also shows how brace plates were placed between the two I-beams to prevent them working sideways, thus making everything solid between the two outside I-beams. Previously every year we had to lower the boom and frame and put in the four bolts directly under the frame. As soon as the rail and double wedge were installed it saved the trouble of installing these bolts.



Bolster casting. Inset at right shows a portion of the top flange of the I-beam cut away, and cross section of arm casting to show wedges installed. Note heavy open springs (in inset) to force wedge; and the set screw in angle iron

Loading Platform

A PLATFORM for loading cars from trucks, which may be lifted out of the way when not in use is shown in the photograph. The platform is hinged and counter-



Hinged platform

weights make it easy to lift. One of the counterweights, a piece of scrap iron, may be seen at the left of the fence post between the middle and upper bars. The posts are hinged to the bottom of the platform and stand against the abutment when the platform is raised. When the platform is down they are held in place by the rods shown which are hooked into heavy staples. One of these is shown just over the man's hat.

Handy Mounting for Welding Outfit

TO CARRY an oxygen and an acetylene cylinder on most small automobiles requires considerable ingenuity unless the car body is practically rebuilt. In most cases rebuilding means ruining the appearance of the body. This is not at all necessary for the outfit can be mounted on the fenders as shown in the illustration.

Improvised welder mounting

Various Rock Products Subjects Discussed by Mining Engineers

Symposium on Silicosis Adds Much Helpful Literature. Geophysical Methods of Prospecting Applied to Sand and Gravel and Stone Deposits: Santa Cruz High Silica Cement Described

THE ANNUAL MEETING of American Institute of Mining and Metallurgical Engineers at New York City, February 19-22, included a program of more than ordinary interest to rock products producers. Unfortunately very few were there to hear or take part in the discussions.

One entire day was devoted to papers and discussions on the problem of silicosis in industry, which has become a problem of prime importance to all operators of mines, quarries and gravel and sand pits, where drilling, crushing or grinding operations give rise to mineral dusts of all kinds. For the term "silicosis" is rapidly giving way in damage suits against operators by their employes to the broader term "pneumonoconiosis," which includes diseases and alleged diseases caused by dusts from every source.

Benjamin F. Tillson, consulting mining engineer, acted as chairman and opened the meeting with an interesting survey of the whole subject. He emphasized particularly the racketeering aspects of most of the present suits. In one single state there are claims pending for over $58,000,000! A single suit may cost the operator $50,000. This racketeering is due chiefly to the absence of special compensation laws, and because such damage suits are now brought under the common law, before inexperienced juries and judges. The cost to operators of silica grinding plants in New Jersey for settling these common law cases has already reached $10 per $100 of payroll, although the risk is supposed to be covered by an insurance rating of $1.46 per $100 of payroll. In Wisconsin, where special attention has been given the silicosis hazard in compensation insurance, the rate is now over $8 per $100 of payroll.

Need Extensive Research

Mr. Tillson said that there was not enough technical knowledge available to cope with the problem, and later in the program recommended that all interested in the subject contribute to found a research organization at Columbia University to study all phases and aspects of the dust hazard, that justice might be done industry as well as workers. A feature of the meeting was a silicosis X-ray clinic, held for members of the Institute —the opening move of the Columbia Unisity Council for Pneumonoconiosis Research.

The most dangerous dust, Mr. Tillson stated, is finer than 10 microns, 0.0004 of an inch, in diameter. Dusts such as this are produced in stone and granite quarrying, in the mining and excavation of silica-bearing rocks, in sand blasting in foundries and manufacturing plants, and in the manufacture of abrasives, glass products and ceramics. Free silica dust and finely divided quartz are the chief offenders, but according to Mr. Tillson, other silicate minerals are suspected of causing silicosis to a greater or lesser degree.

The usual physical examinations such as given in mines and industrial plants, do not detect silicosis until it is in too advanced a stage, and thus beyond cure; but, according to Mr. Tillson, those experienced in the study of X-ray photographs of the chest can detect it at such an early stage that the patient is not incurably affected, and incapacitated, due to the changes brought about in the lung tissues. He said that the X-ray equipment is thoroughly developed and available and that a technique has been devised which can be learned and applied by the medical staffs of industrial plants.

Adequate ventilation is the best preventive method, since in this way the greater portion of the total dust is removed entirely and the hazard caused by the fine dust is minimized by diluting this fine dust with large volumes of air. Mr. Tillson pointed out that the dilution was an important consideration, since all of us to a greater or lesser degree are exposed to silicosis as a result of the smoke nuisance which exists in all large cities, and the road dusts both there and in the country. Respirators, as at present known, are not considered adequate protection, but gas masks, equipped with air lines, are used effectively in certain instances as in sand blasting. Spraying the mines and industrial workings with water undoubtedly reduces the dust content of the air but, unfortunately, has not caught the finest particles.

Silica a Poison

Dr. Leroy U. Gardner, Saranac Laboratory, Saranac Lake, N. Y., a leading authority on silicosis, described the medical phases of the disease. He said that silica is a definite body cell poison; that colloidal silica injected into the blood stream causes death; that silica dust has a different reaction in the body from other mineral dusts. One may not show immediately the harmful effects of breathing too much silica dust. It is known to promote tuberculosis and pneumonia; and this is not known to be true of other mineral dusts, including silicates. Dr. Gardner was not inclined to put much faith in the recent reports from Dr. Wm. R. Jones, of South Africa, that sericite is the cause of silicosis, but he intends to experiment with it. Dr. Gardner said that *non-siliceous dusts* may accumulate in the lungs and set up some local inflammation, but they do not have the same effects as silica dusts. The damage to the lungs in silicosis does not come from "drowning" or filling up the air cells, but from the formation of "scar tissue."

Formation and character of mineral dusts were described by Prof. R. J. Colony, department of geology, Columbia University. Silica, in one form or another, constitutes about 25% of the earth's crust. He thought it quite possible that silicates are dissolved in the human body. Sericite is a very minute kind of mica, and is not a common mineral, although possibly because of its fineness it constitutes a considerable percentage of the air dust in some mines and quarries.

Particle Size Determination of Great Importance

In the determination of silicosis hazards, or the amount of risk a worker runs, or the extent to which his physical condition is the result of dust exposure, it is absolutely necessary to know three factors: (1) the amount or time duration of exposure to the dust (dosage); (2) the concentration of the dust in the air he breathes; (3) the character of the dust. These were the angles of silicosis discussed at length by Dr. Leonard Greenburg, Yale University Medical School, New Haven Conn.

All authorities agree that only the finest sized particles of dust are harmful; the coarser sizes are filtered out in the nose and nasal air passages; consequently particle size determination is a most important part of dust hazard studies. Dr. Greenburg discussed five ways of determining particle size, the advantages and disadvantages of each method, the difficulties in getting representative air samples, the limitations of laboratory results, etc. He said particle size has an important influence on the rapidity and acuteness of the disease; that probably all harmful dust was very fine (less than 5 microns), and that dust of this size constitutes 2½ to 5% of industrial mineral dusts. Dr. Greenburg said we were probably not interested in dust coarser than 5 microns (or better ½ to 1½ microns). From 40 to 60% of such dusts are retained in the lungs.

Dr. Lincoln T. Work, of the chemical engineering department, Columbia University, discussed mechanical details of sample

collecting apparatus, stressing the difficulty in getting a really representative air sample.

Dust Collection in Percussion Drilling

Dust collection at percussion rock drills was described by R. A. Brackett, of the Spencer Turbine Co., Hartford, Conn., who said in part:

"It has become evident that more effective means must be employed to maintain safe dust concentration in the air. This has been attempted in several different ways, some of which are summarized as follows:

"(1) Prevent the formation of dust. This would probably be the ideal solution if other means than drilling, shooting or wedging could be found for breaking rock. However, no such practical means are now available. Wet drilling does accomplish this to a certain extent by laying the dust the instant it is formed, and several different types of drills are now available. The more important of these are: (*a*) Standard water type drill, putting both water and air down the drill steel; (*b*) vented water type drills when water and a small amount of air are directed down the drill steel; (*c*) drills vented with a special tight connection between the tube and drill steel, putting water and minimum amount of air down the steel; (*d*) standard solid piston type drills when no axial hole is striking the end of the shank. This uses a separate water box to push all water at pressure and no air down the steel; (*e*) any of these wet drills in addition could use soap solutions or other chemical substances to aid the water in wetting and laying the dust; (*f*) also any of these types of drills are considerably improved by providing a suitable number of blows of proper force and correct speed of rotation to give maximum amount of large size chips in the cutting.

"(2) Provide a clean supply of air for breathing purposes. This is accomplished for underground work with certain types of respirators. That is, respirators provided with reducing air line, or to a separate supply of low pressure air with intake brought in from the surface. Also respirators of the filter type with renewable or cleanable filter elements on each man, are sometimes found effective.

"(3) Ventilate to change the general air rapidly enough to keep the dust content in the air to a suitable low figure.

"(4) Control the dust at the source. This can be accomplished by either general or direct collection probably considered the most effective and practical method. (*a*) general collection of the dust consists of dust collectors in the approximate vicinity of the source of dust and pneumatically conveying the dust-laden air to large filters, then discharging the clean air back into the working area using either mechanical filters or electrical precipitation; (*b*) direct collection of dust means collecting all of the dust at the point of discharge into the work area such as at the collar of the drill hole and depositing it in suitable containers.

Dust control by hood (top views) and by suction tube lines

"Two methods now considered are the dust-tight connection between the rock face drill steel, and the suction tubing, and a loose mechanical fit between the rock face steel and the suction tubing. The first mentioned or tight connection necessitates dry drilling with enough air forced down the drill to clean the hole and offers mechanical difficulties to maintain the tight fits on the uneven surfaces encountered on rock drilling. The loose fitting hood, on the other hand, overcomes all of these objections and can easily be adapted to the actual conditions encountered in rock drilling. It also has the advantage that this type of dust collection can be used with either wet or dry drilling. The amount of suction necessary to pick up the dust particles will not detract the flow of muck and water from the drill hole, but will effectively pick up all the dust and fine particles. Wet drilling is often considered necessary on account of the nature of the rock, and together with a dust collecting suction device is required where very low dust counts are to be obtained, particularly in a confined working place with limited ventilation.

"However, dry drilling can be used underground with this type of dust collecting (where general ventilation is good) or for outdoor work and low dust counts maintained, as will be shown later.

"Considerable experimenting has recently been made along several of these lines, such as the vented drills now used in the South African mines and which are being given serious consideration in this country at the present time. Also improvement of that method where the dust is removed at the collar of the drill hole by the loose connection hood and stationary or portable vacuum producers with mechanical filter apparatus.

"There has recently been developed a special vacuum producer and separator to handle this problem and we will here mention some of our experiences with this equipment and the results which have been obtained.

"The outfit consists of a metal cap placed against the face of the rock through which

the drill steel can easily be inserted. This is connected through a primary and secondary separator by means of flexible hose connections to the vacuum producer. Hoods have been adapted for vertical, horizontal and stope drilling and are so arranged and mounted as to become immediately effective when collaring the hole, and remain in place continuously. This allows for changing the drill steel without inconvenience or delay to the drill operator. No attempt has been made to maintain a tight seal between the hood and the face of the rock as sufficient volume of air is maintained through the hood to draw a steady stream of the dust-laden air wet or dry from the drill hole. The hood is held in position for horizontal drilling by an adjustable arm extending from the drill column and provision is also made for holding the hood in stope drilling. For vertical drilling in quarry or surface work the weight of the hood and the fit around the drill steel is sufficient to keep it in place. The connections between the hood and the first or primary separator is with a flexible rubber hose, usually about twenty-five feet long, small enough in diameter to be easily handled and large enough to keep and maintain a sufficient vacuum when passing the required volume of air.

"The primary separator can be arranged for either wet or dry drilling and 95 to 98% of the dust or sludge is collected at this point. This container is large enough to hold approximately one-half a day's drilling of one operator and one is supplied for each drill. Extra primary separators should be available, allowing replacement to be made and the full units removed to the surface or other convenient point for emptying. This prevents the possibility of stirring up any dust in the confined area and also allows easy deposition of the dust which incidentally has a market value. The primary separator should be located as close to the drilling as possible, as mentioned, usually about 25 ft. From this primary separator a second length of hose is used to connect to the secondary separator and vacuum producers. This can be either a stationary or portable unit depending upon local conditions.

"For a stationary installation these connections would be made to inlet valves located at convenient intervals on a pipe line extending throughout the entire project similar to a central vacuum cleaning system used in hotels, office buildings, etc. The vacuum producer and secondary or bag type separator is mounted in some convenient place and exhaust into the general air either underground or on the surface. This type of installation has the advantage that there is no limitations of weight, and a unit of this kind would be practical to take care of as many as fifty drillers operating at one time.

"A portable unit, on the other hand, must be small and light enough to be easily handled, yet with sufficient bag area in the filters to remove the very fine particles of dust—that is, less than 10 microns in size.

"One such portable incorporates all of these desirable features, including light weight, convenient carrying handles, with powerful suction to remove all the dust particles and maintain low dust counts. This portable vacuum producer consists of the bag filter or secondary separator where the fine particles are collected, and the centrifugal type vacuum machine mounted as an integral unit. This entire machine weighs less than two hundred pounds and can be furnished with an electric or air motor, or be driven by a gasoline engine. The filters or bags are arranged so that the dust collected is deposited in a pan at the bottom of the separator, easily removable.

"Such a unit arranged for handling two drills was recently tried out in a mine with very satisfactory results. The entire equipment consisting of the hoods and hose, the two primary separators and the secondary machine, were of such size they could be lowered at one time in the lift and moved to the working zone on a regular mine timber car. Power for the electric motor was taken from the trolley circuit, although air from the drill air line could have been used if an air motor had been supplied.

"Dust counts were taken of the general mine air and also when drilling at the driller's breather zone, with and without the dust collectors running, and with and without auxiliary ventilation. Holes were drilled with standard stope drills, wet and also dry, in order to determine what might be expected from this type of protective equipment. The dust counts varied considerable, with anywhere from two to fourteen times the original dust content added when drilling without the hood. With the hood, from one-half to two times the original dust content was added and in all cases showing a final result well within the usual accepted safe limits.

"The Connecticut Department of Health Bureau of Occupational Diseases, due to its great interest in this important problem, has very kindly cooperated with us in obtaining actual data on the results obtained with our dust collector. A series of tests were recently completed where dust counts were taken simultaneously at the operator's breathing zone and at the exhaust of the vacuum producer. Using the standard impinger dust sampling apparatus and counting technique as recommended by the United States Public Health Service, the following dust counts were obtained with the portable dust collecting unit underground in a confined area:

Test No.	Million particles per cu. ft.	Sample taken	Remarks
1	2.36	General air	No drilling
2	4.41	Exposure of operator	Wet drilling without dust collector
3	2.40	Exposure of operator	Wet drilling with the dust collector
4	1.97	Exhaust of collector	
5	6.05	Exposure of operator	Dry drilling with the dust collector
6	.54	Exhaust of collector	
8	203.0	Exposure of operator	Dry drilling without collector

"These tests were effected without comparing the speed of drilling, but it is generally found that increased footage can be obtained when the dust is kept out of the hole.

"The dust counts taken under a wide variety of conditions lead us to the following conclusions: That for underground work where the required dust count is not particularly low, some form of water tube drills could be used, or dry drills with the dust collector. Where the dust count required is below five million in underground or confined areas, water tube drills with the dust collectors will be required. For surface work such as in quarries and excavating—hollow piston or air tube drills with the dust collectors will maintain satisfactory working conditions."

Foam Dust Collectors

C. G. Pursee, Pyrene Co., described the use of foam, produced in a portable machine of a chemical and compressed air, which is introduced into the drill hole through the hollow drill steel in place of plain water. This device was developed in the Ruhr district in Germany, and is being experimented with in England and South Africa. The dust is removed as sludge.

Diagnosis of Silicosis

Dr. Adelaide Ross Smith, Columbia University College of Physicians and Surgeons, and with the New York State Labor Department, described in considerable detail the diagnosis of silicosis: (1) symptoms; (2) physical examinations; (3) X-ray. The symptoms, shortness of breath, cough, pain in the chest, are not found in the early stages of the disease; sometimes they are very late developments. The physical examination includes depth of inspiration (chest expansion), sound from tapping the chest over the lungs, use of the stethoscope, functional tests of the lungs.

The silicosis victim is usually the "barrel-chested" type, according to Dr. Smith; a normal 6-in. chest expansion may be reduced to 1 or 2 in. However, one can not rely on physical or functional tests; the X-ray test is the most valuable. However, the X-ray test is not final since various other conditions than silicosis produce similar X-ray films. One must take into account the history of the case and the physical examination. The early stages of silicosis are particularly hard to recognize.

Dr. C. V. Kilbane, roentgenologist, Manhattan General Hospital, New York City, an outstanding authority on X-ray, stated emphatically that one could not make a sili-

cosis diagnosis from X-ray films. He said he could duplicate such X-ray photographs with those of lungs not affected by silicosis. X-ray photos of tubercular lungs at certain stages look the same; other diseases, including heart defects, sometimes show the same kind of films.

Proposed Research

The research work on silicosis proposed at Columbia University would include: (*a*) case history; (*b*) post-mortem examination of lungs; (*c*) chemical and X-ray study of lungs; (*d*) experiments on animals; (*e*) study of dusts in air, size and distribution; (*f*) study of symptoms; (*g*) radiology. The medico-legal aspects of the problem would be studied with a view to special legislation to prevent racketeering. Prevention measures would be studied. It was suggested that $100,000 would be required for the first year and $200,000 a year thereafter for maybe five years. While that seems like a lot of money in these days, it is really a small fraction of the cost to industry today as a result of common law suits and racketeering.

Canadian Experience

A representative of the Ontario Department of Mines, Canada, said that the silicosis hazard now costs 1¼% of the total mine payroll, although but 2½% of the men employed by the mining companies are actually exposed. He estimated each case cost the companies $11,000 to $12,000. The companies have had to have contingent liability for resulting tuberculosis reduced. Lump sum payments to take care of partial disability did not answer. Those affected by silicosis who continued to work as miners show no greater, or faster, progression of the disease than those who were retired. The early stages of silicosis in Canada do not constitute legal disability, but diagnosis of the early stages is very difficult.

Based on Canadian experience, which has advanced farther than in this country, the following conclusions and recommendations were made: (1) improve working conditions; (2) have thorough physical examinations of employes made regularly, and before putting any new man to work; (3) engage in preventive research. Because of the uncertainty in diagnosis specially trained medical men are necessary. If dust prevention is practiced it is not necessary to remove men in the early stages of silicosis. Compensation should not be paid for early stages of the disease; there should be a time limit for later disability liability. Operators were advised to keep their hands to some extent on physical examinations of employes.

Geophysics Applied to Rock Products Industry

Geophysics, which is a relatively new science of studying underground formations, originally used for the location of oil and ore deposits, is now being applied to such problems as depth of overburden of rock and gravel deposits, determination of clay seams, etc. The method and apparatus involved are simple, consisting merely of passing electric current through the earth between metal stakes, but the calculations are involved and difficult. The conductivity of various kinds of soil, rock, etc., are known, and hence underground conditions fairly well predicted. Various phases of the subject were described in a joint session on nonmetallic mining and geophysical methods of prospecting.

The Wisconsin State Highway Department has made practical use of geophysical surveys in its study and development of stone and gravel deposits. This work was described in detail by Karl S. Kurtenacker, of the Wisconsin Geological Survey, and will be described in a later issue of Rock Products.

High Silica Cement

One of the few papers the American Institute of Mining Engineers has ever had on the subject of cement was contributed by Robert A. Kinzie, Jr., Davenport, Calif. The author briefly traced the history of hydraulic cements. He then described his company's product, none too definitely. Following are some quotations.

"The common acceptance of one standard has done much to help the phenomenal growth of the portland cement industry in this country. The use of one standard for a material to be used under widely diverse conditions is not good practice; yet, for most construction purposes, portland cement is ideally suited, although there are many conditions under which it should not be used. This has been particularly noticeable in late years when cements manufactured to comply with the specifications have shown all gradations of resistance to deteriorating influences. The specifications recognize only the strength of a cement, with a few minor concessions to soundness. The two main sources of weakness in cement are the free lime liberated on hydration and the susceptibility of the contained tricalcium aluminate to attack by many common salts.

"The first cause of weakness has been aggravated by the increased strength requirements of the standard specifications for cement. To meet the progressively higher demand for strength, the lime content of the cement has been increased. This augments the free lime in the cement after a time of hardening. Lime in the form of hydrate has no cementing value. Further, it is a point of weakness where the cement is subject to the action of water, whether pure or containing dissolved salts. The effect of pure watr is seen particularly in dams, where the percolating water, having leached lime from the concrete, deposits it in stalactites or a thick coating on the surface. In well designed structures, even where there is no percolation, the surface of the concrete is often attacked and becomes susceptible to disintegration by frost. Free lime is chemically active and readily reacts with many salts carried to it dissolved in water. Common examples of this action are seen where concrete is used in alkaline soils or in ocean water.

"The second source of weakness is to be found in tricalcium aluminate. This compound contributes largely to the early strength of cement, and for this reason many modern cements contain it in large percentages so as to develop the high early strength in demand today. However, while tricalcium aluminate is suspected of many things, it is known to generate large amounts of heat on setting, thus leading to shrinkage cracks as the structure cools. It is also known to be particularly susceptible to the corrosive action of dissolved sulfates.

"Neither of these compounds, free lime and tricalcium aluminate, has been recognized in the specifications. This has led to the demand for special cements, where adverse conditions must be met, as in the Hoover dam. The new type of cement, usually called a low-heat cement, cures the trouble due to tricalcium aluminate, and to a slight extent diminishes the amount of lime set free on hydration. The liberation of free lime, however, is inherent in portland cement.

"To correct this defect the Santa Cruz Portland Cement Co. has developed a high-silica cement. In this cement the clinker is ground with a puzzolanic material which reacts with the lime as it is liberated. As defined by the Department of Scientific and Industrial Research (Great Britain), 'A substance is said to be puzzolanic when, while not necessarily cementitious by itself, it possesses constituents which will combine with hydrated lime at ordinary temperatures in the presence of moisture to form stable insoluble compounds of cementitious value.'

"Puzzolanic substances were used by the Romans and the inhabitants of India to increase the utility of lime mortars; it has been used in more recent times to increase the chemical stability of portland cement. Our use of this type of material will be discussed, first as to its effect on portland cement, and second as to the method of its manufacture.

Physical Characteristics of High-Silica Cement

"While the high-silica puzzolanic compound is not sold, tests have been made to determine its value as a cement. Table 1 shows that, while the early strengths are low, there is a satisfactory gain in strength with age. This compound is not merely an admixture but contributes to the strength of the cement and, much more important, it increases the chemical stability of the fin-

ished cement, as tests quoted later will show.

"The strengths were determined on a concrete composed of one part compound, two parts sand, and four parts graded rock, by weight. The water-cement ratio was 0.925 (by weight) and the slump was 2½ in. The fineness of the cement was 98.3% through 200 mesh and 70% below 10 microns.

TABLE 1—COMPRESSION STRENGTH OF PUZZOLANIC COMPOUND

	Lb. per sq. in.
1 day	37
3 days	148
7 days	391
28 days	787
3 months	1292
6 months	1777
9 months	2115
1 year	2554
2 years	2881

"To determine the conditions under which the best results would be secured, high-silica cements were made, using a compound in which the shale was in one case raw, and in the other calcined. Table 2 shows that the calcined shale made a high-silica cement of higher strength, as determined on 1-2-4 concrete, proportioned by weight. The aggregate in the concrete used in all tests follows a grading curve quite close to that required by the California State Highway Department. There are six sacks of cement (94 lb. per sack) per yard of concrete.

TABLE 2—COMPRESSION STRENGTH OF CONCRETE USING HIGH-SILICA CEMENT MADE FROM RAW AND CALCINED SHALE

Raw and Calcined Shale	Calcined	Raw
Per cent through 200 mesh	96.1	94.4
Water-cement ratio, by weight	0.575	0.550
Slump	1¼ in.	1 in.
	Lb. per sq. in.	Lb. per sq. in.
1 day	1105	669
3 days	2810	2401
7 days	3615	3440
28 days	4730	4835
3 months	5525	4900
6 months	5425	4225
9 months	6277	4629
1 year	6290	5080
2 years	6000	5110

"In addition to the routine tests prescribed by the standards of the American Society for Testing Materials, concrete specimens are made from an average sample of each day's grind of high-silica cement. Table 3 gives the average values obtained on the cylinders tested from January 6, 1932, to August 11, 1933; the average slump was 2 in.

TABLE 3—AVERAGE COMPRESSION STRENGTHS OF CONCRETE MADE OF HIGH-SILICA CEMENT

	Lb. per sq. in.
1 day	977
7 days	3132
28 days	4320
3 months	5030
6 months	5256
1 year	5698

Resistance to Saline Solutions

"The deterioration of concrete in sea water and in alkali soils has been of great concern. To test the resistance of cements to these conditions several accelerated tests have been suggested. The one used in our laboratory follows in general the procedure of Thaddeus Merriman. The cements to be tested are made into briquets or cylinders, using one part by weight cement and three parts standard Ottawa sand, and dimensioned according to the standards of the American Society for Testing Materials. They are cured one day in moist and six days in water. The specimens are then completely immersed in a 10% solution of sodium sulfate. When the strength of the solution falls below the minimum set by Mr. Merriman (when 5 c.c. N_2 acid fails to neutralize 25 c.c. of the solution) it is replaced. The tank containing the specimens is kept covered and at a temperature of 70° F.

"The tests recorded in Table 4 were run on one sample of high-silica cement and four samples of local portland cement, bought in the open market. The analyses and the computed compound compositions are first given; the hypothetical compound composition of high-silica cement cannot be calculated from analysis. The compression strengths are the averages of three specimens at each age.

Heat of Hydration in Cements

"A characteristic of cement which has lately received much attention is the heat of hydration. The intergrinding of high-silica compound with a portland cement clinker reduces the heat of hydration.

"The test recorded in Table 5 compares a low-temperature portland cement and two high-silica cements made from the same clinker. In one case (high-silica No. 3) the clinker was ground with 30% of compound, and in the other case (high-silica No. 5) with 50% of compound. These tests were made in the same apparatus as was used in the experimental work for the Hoover dam. The heat of hydration of the portland cement was determined by the heat of solution method and that of the No. 5 high-silica cement in an adiabatic calorimeter; the value for the No. 3 high-silica was interpolated, as had been proved to be justified by the results of other tests.

Manufacture of High-Silica Cement

"The manufacture of high-silica cement utilizes a portland cement clinker made in the usual manner; the only change is the grinding of the high-silica compound with the clinker before the cement is marketed. This entails no difficulties except in the grinding of the finished cement. As it has not been found feasible to grind the cement in ball and tube mills for its entire reduction, Hardinge mills with air classification are used down to 94% through 200 mesh, and this material is finished in tube mills to 98% through 200 mesh. The effect of this second grinding is particularly noticeable in the increase of the smallest sizes of particles. The use of two grinders is due to mill conditions; the Hardinge mills have made a satisfactory cement without any further grinding.

"The course of the lime and shale for the clinker and of the shale for the high-silica compound are the same as far as the mixing bins; here the material for clinker is further ground while the material for the high-silica compound is burned without further grinding.

"The material as received at the mill is broken to about 2-in. pieces in a No. 18

TABLE 4—EFFECT OF 10% SODIUM SULFATE SOLUTION ON VARIOUS CEMENTS

Analyses:	Santa Cruz high silica		1		2		3		4	
CaO	52.46		65.13		65.23		65.33		65.03	
MgO	1.88		1.91		1.55		2.28		1.45	
Al_2O_3	8.20		6.75		5.83		6.05		8.28	
Fe_2O_3	2.72		2.65		1.97		2.65		2.42	
SiO_2	31.30		20.40		21.00		21.60		20.30	
SO_3	1.26		1.59		1.77		1.65		1.72	
Loss	1.70		1.50		2.50		1.28		1.10	
Compounds:										
Calcium sulfate	...		2.70		3.01		2.81		2.92	
Tetracalcium	...		...		...		...		...	
Alumino ferrite	...		8.06		5.99		8.06		7.36	
Tricalcium aluminate	...		13.38		12.11		11.53		17.83	
Tricalcium silicate	...		56.29		58.69		52.46		46.32	
Dicalcium silicate	...		16.09		16.00		22.42		23.32	
	Na_2SO_4	H_2O	Na_2SO_4	H_2O	Na_2SO_4	H_2O	Na_2SO_4	H_2O	Na_2SO_4	H_2O
Compression strength lb. per sq. in.:										
1 day	...	195	...	175	...	253	...	123	...	140
3 days	...	301	...	291	...	380	...	226	...	300
7 days	...	388	...	371	...	435	...	280	...	366
28 days	605	495	402	423	535	505	410	410	422	451
3 months	722	...	4	415	496	513	304	456	0	460

TABLE 5—EFFECT OF HIGH-SILICA COMPOUND ON HEAT OF HYDRATION

Analyses:	Portland cement	No. 3 High-silica	No. 5 High-silica
SiO_2	24.24	33.68	43.46
Fe_2O_3	4.16	4.01	3.78
Al_2O_3	5.28	7.03	7.28
CaO	60.61	49.08	39.74
MgO	2.81	2.44	2.51
SO_3	2.27	1.99	1.49
Loss	0.93	1.57	1.83
Fineness:			
—200 mesh	95.11	95.30	98.38
Heat of Hydration, Cal. per gram:			
1 day	.....	22	18
3 days	.....	31	26.5
7 days	49	38	33
14 days	55.5	43	37.5
28 days	61.5	49	43.5
3 months	75.5	62	56

gyratory crusher and four No. 6 gyratory crushers. The fine material is screened out between the primary and secondary crushers. The crushed material is stored on an outside stock pile, and is segregated into shale, high lime, and low lime. It is drawn as wanted, dried, and put into five concrete bins of 325 tons capacity each.

"The material is then drawn and crushed in a No. 7 Symons cone crusher. This product is screened on Hum-mer screens equipped with 7-mesh cloth; the screens operate in closed circuit with three 40x36-in. rolls. The fines from the screen are sampled and put into steel bins of 80 tons capacity each; there are 29 of these bins for clinker material and 11 for high-silica compound material.

"A continuous sample, taken as the bin is filled, is cut, ground, and analyzed. From the analysis the operators in control of the concrete storage bins and the stock pile can tell whether the material sent to the screens is correct; if not, the percentages of high and low-lime materials are changed (also the shale).

"The 29 steel bins for clinker are in two units, each feeding a mixing screw after the material has been weighed on a constant-weight feeder capable of delivering 100 tons per hour. From the known analysis of the contents of each bin the chemist can select one or two bins of each group to be drawn. The material from the mixing screw is sent to one of three Hardinge mill bins of 1,000 tons capacity and from there to the Hardinge mills. These are equipped with air classifiers. In addition, two of them operate in closed circuit with Sturtevant classifiers, one of 16-ft. and the other of 14-ft. size.

"The ground product of these mills is delivered to one of eight concrete blending bins of 320 tons capacity. The material is drawn from two of these bins and sent to the kiln bins; these have a capacity of 111 tons. The material in excess of that needed is carried to a surge bin of 300 tons capacity. The material from the surge bins, together with that material blown out of the kilns and collected in the stacks, is put back in the circuit ahead of the blending bins. By this method the raw mix fed to the kilns is kept at constant composition. The clinker from the kilns is stored on an outside stock pile.

"The high-silica compound is drawn from the mixing bins to the kiln where it is calcined. After passing through a vertical cooler, it is taken by belt conveyor to two steel storage bins of 200 tons capacity. From these bins it is drawn over Hardinge constant-weight feeders and fed to the Hardinge mills as needed.

"The clinker from the stock pile is all crushed in a 54x24-in. roll. Part of this is ground in ball and tube mills with gypsum to make cement. The rest of the crushed clinker is screened by four Hum-mers covered with 4-mesh cloth, and in closed circuit with one 40x36-in. roll. This undersize material from the screens, depending on its composition, can be made into oil-well cement, commercial cement, or high-early-strength cement in the No. 2 Hardinge mill. For cement of the latter type, the product of the Hardinge mill is ground in tube mills. For high-silica cement, the high-silica compound, clinker, and gypsum are ground in the Hardinge mills Nos. 1 or 2, and the product further reduced in tube mills. The cements are delivered by Fuller-Kinyon system to the stock house.

"The gypsum to be ground with the cement is fed to the Hardinge mills raw or calcined, but to the tube mills only in raw state. The gypsum is calcined and ground in a Raymond impact mill.

"All of the materials fed to Hardinge or tube mills pass over synchronized constant-weight feeders. The amount of feed to the Hardinge is controlled by the power demand of the mill. In case of a failure in any part of the feed mechanism, or a lack of any of the materials, all of the feeding mechanisms are stopped.

"Table 6 shows the size of the material at various stages in its comminution. It will be particularly noted that the efficiency of the Sturtevant classifiers is very low; however, with the first two Hardinge mills (not primarily designed for this work) this separation is necessary to bring their capacity up to that of No. 3 Hardinge, which was designed in the light of experience with the first two mills."

TABLE 6—SCREEN ANALYSES OF MATERIAL AT VARIOUS STAGES

	Symons cone crusher feed						Sturtevant classifiers		
	High-lime	Low-lime	Symons product	Screen over-size	Roll product	Feed to Hardinge	Returned to Feed	Returned to Hardinge	Product
2½ in.	15.5								
1½ in.	26.4								
¾ in.	39.3	7.0	1.3	0.5					
½ in.	6.1	8.3	6.4	4.47					
⅜ in.	3.2	11.4	15.7	9.86					
3 mesh.	1.6	9.2	14.7	13.07					
4 mesh.	1.2	8.7	10.5	26.28	0.06	0.24			
6 mesh.	1.0	7.9	8.3	35.24	4.12	5.91	0.8	0.8	
8 mesh.						16.65			
10 mesh.	1.5	15.2	13.8	8.62	31.40	14.35	3.5	4.2	
14 mesh.						10.87			
20 mesh.	0.9	10.7	8.9	0.85	19.30	8.92	3.1	3.2	
35 mesh.	0.7	8.8	8.0	0.30	15.70	17.02	5.6	6.5	
48 mesh.						6.03			
65 mesh.	0.4	2.9	5.1	0.16	11.00	4.86	14.5	16.9	0.1
80 mesh.	0.3	2.3							
100 mesh.			1.6	0.06	3.60	3.41	11.8	12.9	0.5
200 mesh.			2.6	0.15	4.90	4.89	30.5	33.5	10.5
Total	98.1	92.4	96.9	99.56	90.08	93.15	69.8	78.0	11.1
Passing last screen..	1.9	7.6	3.1	0.44	9.91	6.85	30.2	22.0	88.9

Otho M. Graves Resigns as Director N. C. S. A.

AS CHAIRMAN of the Code Authority of the Crushed Stone, Sand and Gravel, and Slag Industries, Otho M. Graves has felt it desirable to resign as a director of the National Crushed Stone Association, to which office he was elected at the January convention. At that time he refused membership on the executive committee of the association for the same reason.

Future of Highway Construction at Stake

TWO BILLS are pending in Congress to provide more money for Federal aid road construction, one introduced by Senator Hayden would provide $125,000,000 for each of the two fiscal years 1935 and 1936, to be matched in part by state money; the other introduced by Congressman Whittington would provide an additional $400,000,000 for use of PWA after July 1, 1934. Which, if either, is enacted depends largely, it is said, on whether the public really wants or demands more highway building.

In the meantime state money for highway construction is steadily dwindling, not for lack of revenue from motor vehicle owners, but because more and more highway money is constantly being diverted to other purposes. Total state funds for highway construction and maintenance for 1934 are estimated at $378,897,000; in 1933 the state money spent was $495,724,000; in 1932 the total was $587,172,578. Obviously, unless something is done soon to arouse public interest, the highway building industry will cease to be the important factor of the construction industry that it has been.

Cement Business of U. S. Steel

UNIVERSAL ATLAS CEMENT CO., Chicago, Ill., subsidiary of the U. S. Steel Corp., produced 6,957,100 bbl. of portland cement in 1933, compared with 7,113,300 in 1932, a decrease of 2.2%. Shipments were 6,726,598 and 8,527,351, respectively, a decrease of 21.1%. Exports (presumably white cement) decreased from 116,229 bbl. in 1932 to 89,356, bbl. in 1933—23.1%.

The Steel Corporation's annual report does not segregate the cement end of its business in dollars and cents, from the other manufactured products. Apparently no important capital expenditures were made on the cement plants.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

A Sales Program For the Concrete Products Manufacturer

Abstract from W. G. Kaiser's Address Before Regional Conventions Shows Widening Market for Cement and Aggregates in Building and Modernization

IN CONNECTION with government projects such as PWA and CWA work, in the small industrial building field, in farm-and-city residence modernization and new low-cost home building, and in pre-cast specialty work, new avenues of sales are opening up for concrete products manufacturers. Accompanying illustrations show applications of concrete products. Each one denotes a trend toward increased use of aggregates and cement in building projects.

The pictures and individual items mentioned at random in the following material are not important *in themselves.* But they do indicate the trend which progressive plant managers are following with the slogan "We'll all sell more in '34!" Know the trends and you will know concrete products from the user's angle.

School Construction. This is just one of numerous PWA and local-government projects that bear watching with an eye for promotion of precast concrete units. (See next page.)

Competition. Part of the book "Facts on Concrete Masonry" relates to fire resistiveness. It shows superiority of concrete masonry over clay tile, for example. Present sales trends show that clay tile is becoming a stronger competitor of concrete products, while brick, probably owing to the high cost of mason labor, is gradually going out of the picture.

Harris and Ewing

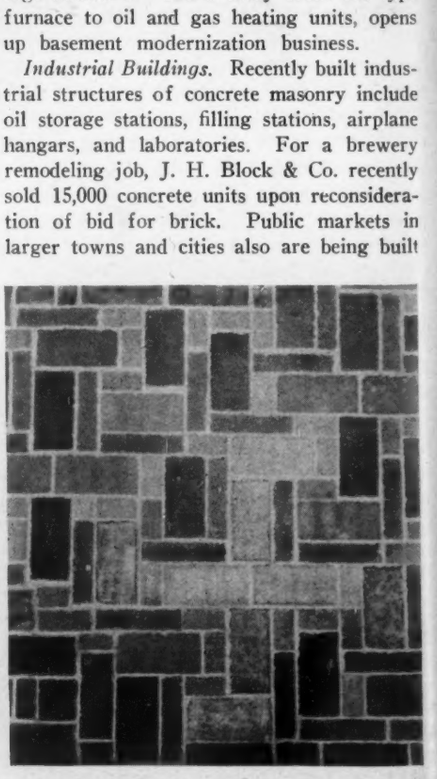
Horace W. Bush, Secretary and Treasurer of the Code Authority for the Concrete Masonry Industry

Housing. With the housing shortage developed in the last few years, there is a good prospect of home building being resumed on a broad scale within a short time. Already progress is being made. A realty company at Marblehead, Mass., recently sold a $30,000 home as a result of its ashlar concrete masonry "model" house. Many new small homes of concrete units are being built.

Modernization. Many old homes are being sold ashlar-wall recreation rooms for basements, new porch foundations and garage additions. Trend away from old type furnace to oil and gas heating units, opens up basement modernization business.

Industrial Buildings. Recently built industrial structures of concrete masonry include oil storage stations, filling stations, airplane hangars, and laboratories. For a brewery remodeling job, J. H. Block & Co. recently sold 15,000 concrete units upon reconsideration of bid for brick. Public markets in larger towns and cities also are being built

Home replacement at Londenville, N. Y. Old home stood around the section of concrete masonry wall which remained after fire. Convinced, the owner built new home all of concrete masonry



Ashlar pattern, unusually pleasing with Swastika pattern, yet showing possibilities for using mostly stock size units

Omaha's "House of Tomorrow," built of concrete masonry, an example of close co-operation among products manufacturers to make public aware of advantages in using this building material

or remodeled to meet the new demands.

Joists. The precast concrete joist is perhaps the outstanding development of the past year in the concrete products field. A year ago, only one plant was making joists. Today there are 25, with 75 more seriously considering them.

An unimpressive looking picture—but the first 1933 milk house sale has been multiplied to 40 times each by at least two concrete products companies

Concrete Products for Schools

WHEN better schools are built in Cedar Rapids, Ia., concrete masonry will build them! Recently, contracts were awarded for four new school buildings in Cedar Rapids on the basis of cinder-concrete masonry. These jobs will require 560,955 units, including concrete brick. The number and sizes of concrete masonry units follow: 333,000 2½x4x8-in. concrete brick, 86,046 8x8x16-in. concrete masonry units, 45,087 8x12x16-in., 81,479 4x12x16-in., and 15,343 4x8x16-in. concrete masonry units. In addition, these jobs will require 500 cinder-concrete lintels.

The Franklin school was awarded to Max Mildenstein, Cedar Rapids, who also received the award for the Roosevelt school. Paulson Construction Co., Cedar Rapids, was awarded contracts to build the Woodrow Wilson and McKinley schools.

And in Tripoli, Ia., too, it looks as if concrete masonry is the most acceptable school building material. Rebholz and Drape, Tripoli, contractors, and Architect C. W. Irwin, Waterloo, report that cinder-concrete masonry will be used on the new local school house. Approximately 58,000 units will be required, according to reports.

Bulk oil station, Gates, N. Y., built of concrete units. Permanent, fireproof construction for such stations is required by a growing number of city codes

New concrete masonry garage built under a back porch. Project grew to include new porch and sleeping porch. Old properties thus are made salable or rentable

Modernizing a farm building with concrete products

This country's 245,000 unprotected grade crossings offer an important market for crossing slabs. Usual slab is 16-in. by 5 or 6-in. (thick) depending on depth of rail. Single track installation sells for from $5 to $7 per lineal foot. Slabs shown above are made with vibrated concrete

New Machinery and Equipment

Wagon Drill

IN ANNOUNCING its Model "WD" drill the Cleveland Rock Drill Co. says that it has a wide application and that it is "much more than a wagon drill." It can be set up for down-hole drilling or for snake-hole work. It will drill, says the company, at any angle between extremes above or below the horizontal. A company engineer states "that when feeding into the rock" the mechanism automatically maintains the drilling machine at just the right position for fastest cutting. When reversing or when approaching the rock, feeding speed may be varied from a few inches to 25 ft. or more per second. Very little air is required for the mechanism—not over 4 cu. ft. per minute for ordinary rates of feed."

Snake hole drilling

The air feed cylinder serves as a boom for the guideways on which the slabback-mounted machine travels when being fed into, or reversed away from the rock.

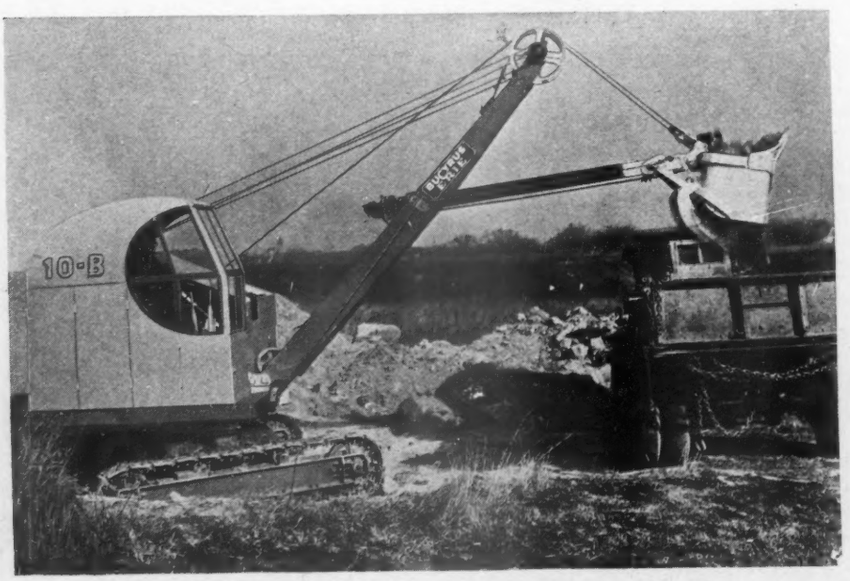
The drilling unit designed for this wagon drill is provided with a special blower operated by a handy valve lever. This hole blowing feature can be incorporated in a wet drill as well as in the dry construction.

Convertible Excavator

FULLY CONVERTIBLE, the new ⅜-yd. excavator, just announced by the Bucyrus-Erie Company is being offered with all types of front end equipment for shovel, dragline, crane, clamshell, drag shovel, skimmer scoop, back filler or pile driver operations.

This unit, says the company, weighs between 7½ and 8 tons, depending on the equipment employed. The comparatively light weight of the machine and its compactness, say the company engineers, are secured by the use of modern, heat-treated alloy steels, and by simplified design.

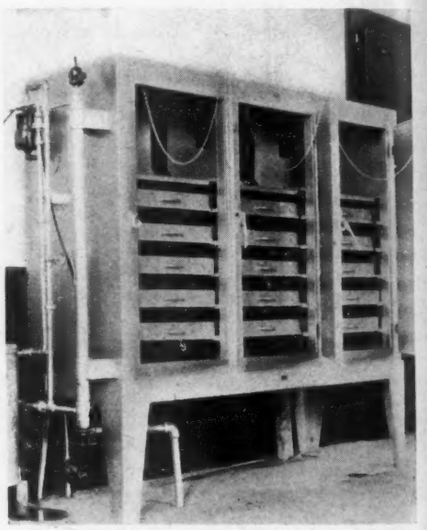
The manufacturer states: "Full-revolving, this Model 10-B offers practical working ranges that compare favorably with larger machines. The shovel with standard boom at 45 deg. has a maximum cutting radius of 20 ft. 3 in., a clear dumping height of 12 ft. 6 in. The crane rating at 10 ft. radius is quoted at 7,000 lb. Dragline and clamshell easily handle a ⅜ yd. bucket on a 28 ft. boom. Among the many mechanical features that make the performance of the 10-B possible, are automatic lubrication; ball and roller bearings throughout; elimination of center pintle by the hooked-roller swing-circle."



Excavator designed for use of alternate equipment

Cement Laboratory Refrigerator

ONE OF THE NEWER applications of electric refrigeration centers in the cement mill. Frigidaire installations recently completed in cement plants in Kentucky and Indiana are making it possible to test cement under the constant and sometimes severe temperature (and humidity) conditions required. An electric refrigeration dealer in Louisville, Ky., has made recent installations in the laboratory of the Kosmos Cement Co., Kosmosdale, Ky., and in the Louisville Cement Co. plant, Speeds, Ind.



Electric refrigeration cabinet and testing trays

The installations consist of a specially designed cabinet of steel with drawers providing 75 numbered compartments in which test briquets are placed. A thermostatically-controlled electric water heater and a Frigidaire compressor with a tank provide a supply of hot and cold water. By means of a regulator, hot and cold water in proper amounts, is introduced into the cabinet through three sprays to effect proper control of temperature and humidity.

Robins Conveying Expands

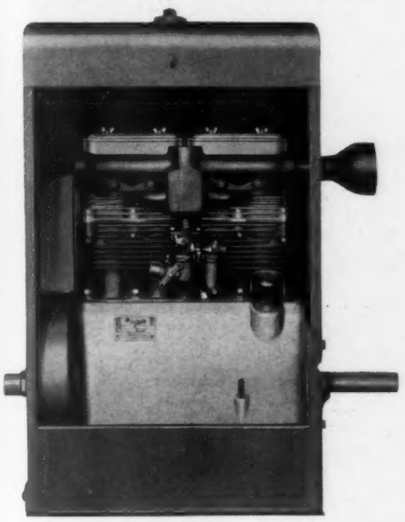
ROBINS CONVEYING BELT CO., New York, N. Y., has acquired the coal and ore handling business of the Mead-Morrison Manufacturing Co., Boston, Mass. The merger, says the purchaser, gives the

Robins line increased scope in the materials handling field. Products taken over include unloading towers, stocking and reclaiming bridges, pivoted bucket carriers, cableways, and car and barge hauling equipment.

At the Robins works in Passaic, a force of men have been installing equipment transferred from the Mead-Morrison plant. Sales volume of the purchased concern formerly ran, it is said, between three and four million dollars a year, compared with Robins normal annual sales of from two to two and one-half million dollars.

Air-Cooled Engine

ITS SINGLE-CYLINDER, air-cooled engine line being an apparent success, the Wisconsin Motor Corp. has developed a heavy duty 4-cylinder air-cooled engine of 6 to 16 hp. capacity. This unit (Model AC 4) has a 2⅝-in. bore and 3¼-in. stroke with a piston displacement of 70.35 cu. in.



Four-cylinder air-cooled engine

It has been designed particularly for heavy industrial service and use in other fields where light weight strength and sturdy power are essentials in engine units. Describing the engine the company says: "The new air-cooled unit develops 10 hp. at 1350 r. p. m. and 'peaks' at 16 hp. at 2600 r. p. m. The outstanding feature of this model is its 215-lb. weight. Complete with house, gas tank, etc., it weighs 265 lb. Overall length is 20¼ in."

For Tough Drilling

SAID TO BE EASIER to handle and faster than old-fashioned types of drills of its approximate weight and type, the new drilling unit produced by the Chicago Pneumatic Tool Co., is recommended by the company particularly for heavy sinking in hard ground, long hole quarry drilling etc.

The maker claims that the valve is positive in action and gives a steady powerful rotation. The drill is equipped with an exhaust choke for emergency blowing in order to keep the hole clear of cuttings. This device, it is claimed, will blow holes clean, down to a depth of 25 ft.

Oil and Heat-Resisting Cable, and New Capacitor

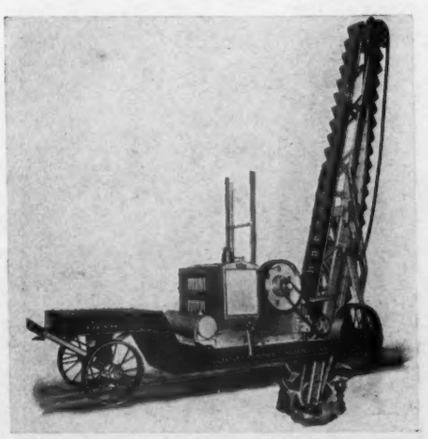
A NEW CABLE insulated with Glyptal-treated cloth and capable of resisting oil and withstanding high temperatures is announced by the General Electric Co., Schenectady, N. Y., and is now available in all types. In addition to its ability to resist oil and heat, this new cable is flexible and tough.

Cable insulated with Glyptal-treated cloth can be used advantageously for low- and medium-voltage leads, apparatus cable, transformer leads, leads for coils and control devices, or wherever an oil-resisting, heat-resisting cable is required.

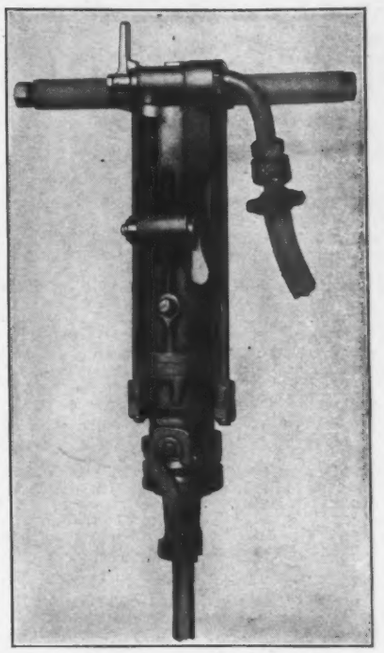
The company also announces substantially reduced prices together with reductions in size, rating for rating, in a new General Electric line of capacitors for power-factor correction. These devices are treated and filled with Pyranol, dielectric material whose insulating and dielectric properties permit an unusually small capacitor for a given rating, and which is noninflammable and nonexplosive, according to the manufacturer. The line also includes new box-type units and small rack-type capacitors, both for indoor service.

The new box-type capacitors, for indoor service, are of the type which can be connected directly to motor terminals or to the line side of a motor switch. These units are enclosed in welded sheet-steel cases and provided with conduit boxes.

The new small rack-type units are an innovation, simplifying the application of small blocks of corrective capacity for industrial plants because the small size of the capacitor greatly reduces space requirements and permits the capacitor to be placed at the most advantageous location from the standpoint of reduction of line loss.



Gruendler's new "Forty-Niner" portable crusher with modern power unit supplied in range from 35 to 125 hp.



Three-inch cylinder drill

Gasket Type Coupling

THE improved double seal coupling (ROCK PRODUCTS, January, 1934) developed by the Champion Machine and Forging Co., is claimed to be equally effective against either pressure or vacuum. The two special steel reinforcements 180 deg. apart on the unit protect the gasket from the pinching action of the two halves of the coupling when being assembled on the pipe.

Positive-seal coupling

Self Priming Centrifugal Pump

THE Chain Belt Co., Milwaukee, Wis., announces a new 3 in. self-priming centrifugal pump which rounds out its line of "Rex" speed primers. This new self-priming unit is of the recirculating type, and is automatic in action after the recirculating system is once filled.

This particular size has been developed to provide a pump very close to the same light weight portability of the 2 in. class, with a greatly increased capacity. The new pump meets the A.G.C. rating for 3 in. pumps with capacity to spare. The unit weighs 385 lb., it is 34 in. high and 37 in. wide, and it is capable of the following capacities: 5 ft. suction lift, 20,400 gal. per hr.; 15 ft. lift, 16,500 gal. per hr.; 25 ft. lift, 9,000 gal. per hr.

THE INDUSTRY

New Incorporations

Macks Creek Sand Co., Pacific, Mo. Incorporator, George W. Leber.

Indurated Concrete, Inc., Ventnor, N. J. $50,000 preferred and 1,500 shares common. no par.

Burkett Sand–Clay Products Co., Milano, Tex. Capital stock, $6,000; incorporators are J. R. and T. F. Burkett.

The Evans Stone Co., Marion, Ohio. Incorporators are: David W. Evans, John K. and John A. Bartram with 250 shares, no par.

Southwestern Asphalt Products Corp., Oklahoma City, Okla. Capital, $3,000. Incorporators are E. G. Burnley, Joyce and Robert Levy.

Van Buren Sand and Gravel Co., Little Rock, Ark., filed articles of incorporation with a capital stock of $3,000 to operate the river front gravel plant on the Arkansas river near the Fort Smith–Van Buren Bridge. J. N. Rutledge and others are the incorporators.

Potomac Glass Sand Co., Wheeling, W. Va., incorporated with a capitalization of $1,–000 and authorization to issue capital stock up to $5,000. To mine, quarry, manufacture, refine and sell silex, sand, limestone and other stones and minerals. The incorporators are: Charles F. Paul, Jr., C. Lee Spillers and Florence M. Rauch.

Personals

F. M. Sanderson, Jr., has been put in charge of the quarry for the Clevenger Stone Co., Easley, Mo.

B. J. Latimer has been appointed superintendent of the Three Forks Portland Cement Co. plant, Trident, Mont.

Edward S. Rogers, Jr., has been appointed general sales manager of the Medusa Portland Cement Co. office, at Cleveland, Ohio.

T. B. Douglas has resigned as advertising manager of the Dewey Portland Cement Co. and has joined a Kansas City advertising agency.

B. M. Bobbitt and G. R. Kind have been elected treasurer and secretary, respectively, of Great Lakes Portland Cement Corp., Buffalo, N. Y.

L. A. Parry, said to be inventor of hexagon paving blocks, succeeds W. H. Sharp, as manager of the Longview Concrete Pipe Co., Longview, Wash.

Franklin Osborn, superintendent of crushing plants at the Andes Copper Mining Co., Potrerillos, Chile, is spending a short leave of absence at Vineland, N. J.

D. D. Thomson has been elected president of the Kentucky Rock Asphalt Co., Louisville, Ky. He succeeds W. H. Tarvin, resigned. Mr. Thomson formerly was engaged in the investment banking business in Chicago.

P. J. Freeman, formerly of the Pittsburgh Testing Laboratory, Pittsburgh, Penn., has been retained by the Tennessee Valley Authority, Knoxville, Tenn., as "Principal Materials Engineer of the Engineering Service Division."

Sam C. Hadden, secretary of the Indianapolis Sand and Gravel Association, in an address at Indianapolis, Ind., recently said: "The code for the mineral aggregates industry has brought the three mineral businesses in to harmony for the first time."

Solomon A. Smith, president of the Northern Trust Co., Chicago, has been elected a director of the United States Gypsum Co. to succeed the late Melvin A. Traylor. C. H. Shaver, secretary and treasurer, was elected a director to succeed the late R. G. Bear. W. L. Keady was the third director elected to succeed C. R. Birdsey, resigned.

Warren Butler, introduced as the man who started production of portland cement in the State of Washington, recently addressed the Kiwanis Club at Tacoma, Wash. He, in turn, introduced Chester N. Reitze, vice president and general manager of the Superior Portland Cement Co. who reported figures to show the present–day status of the cement industry in the state. His company, he said, produces in normal times about 4,000,000 sacks of cement a year, uses 500 tons of powder annually, spends $300,000 a year on repairs and purchases 1,500,000 tons of coal a year for kiln operation.

Ray C. Noll, general manager of Whiterock quarries, Bellefonte, Penn., recently addressed the Bellefonte Woman's Club on the subject of "The Lime Industry."

E. H. France, president of Whitehouse Stone Co., and Erie Stone, Toledo, Ohio, was taken seriously ill the early part of March, following his return from a trip to Florida.

V. D. Hawkins, Topeka, Kan., for about 15 years special representative of the Dewey Portland Cement Co., recently announced his candidacy for the Democratic nomination for Governor.

Obituaries

Fred E. Fenton, 56, assistant treasurer of Hercules Powder Co., Wilmington, Del., died March 13.

Frank J. McGanney, former manager of the Salt Lake territory for Hercules Powder Co., died March 12.

Alfred Neal Shearman, 62, whose concrete pipe company operates plants at Chattanooga, Memphis and Knoxville, Tenn., Tampa, Fla., and other large southern cities, died at his home in Knoxville, March 3, after an illness of several months.

Francis R. Dravo, 68, one of the owners of the Keystone Sand and Supply Co., Pittsburgh, Penn., was among nine persons killed in the recent derailment of a Pennsylvania railroad train in Pittsburgh. Among his various commercial interests was the Dravo Contracting Co. of which he was president.

Cement

Bessemer Limestone and Cement Co. plant, Bessemer, Penn., is to reopen in April.

Signal Mountain Cement Co., Chattanooga, Tenn., recently reopened its plant calling back 120 men.

Universal Atlas Cement Co. plant at Hannibal, Mo., reported early in March an increase of 50% in production.

Lehigh Portland Cement Co. plant, New Castle, Penn., is scheduled for March production.

Preparations were under way in March for reopening, on full schedule, the plant of the Consolidated Cement Corp., Fredonia, Kan.

Plans were announced early in March for reopening of the Pennsylvania–Dixie Portland Cement Co. plant at Richard City, Tenn.

Wabash Portland Cement Co. plant, Osborn, Ohio, closed since December 20, was scheduled to resume 50% capacity operation, March 15.

D. D. Thomson

Lone Star Cement Co., Bonner Springs, Kan., reports a full month operation for March.

Lone Star Cement Co. plant, Greenport, N. Y., has reported operations will be resumed March 29.

Beaver Portland Cement Co. plant, Gold Hill, Ore., recently was put in condition for spring operations.

Universal Atlas Cement Co. plant, Duluth, Minn., resumed operations on a third–capacity basis, March 1.

Superior Portland Cement Co. plant, Seattle, Wash., reopened March 5 on a production schedule calling for a payroll of $12,–000 a month.

Alpha Portland Cement Co. plant, Ironton, Ohio, reports equipment in readiness for resumption of production on a 50% capacity basis by the end of March.

Sand and Gravel

A new gravel pit is being opened up near Hollister, Ida.

A new gravel pit has been opened near Fredonia, Ia.

County authorites are opening a sand and gravel pit near Spearville, Kan.

New gravel property is being opened up near Mazeppa, S. D.

Florida Gravel Co. is removing its offices in Jacksonville, Fla., to larger quarters.

William Aubuchon sand plant, Festus, Mo., reports continued increases in car loadings of sand.

Southland Ice Co., Dallas, Tex., was highest bidder at the recent auction sale of gravel pit property near Dallas.

A. J. Joyce was reelected vice president and made secretary to succeed John Gutknecht of the Material Service Corp., Chicago, Ill.

Two men were severely injured when 5 tons of frozen gravel descended on them in the course of CWA operations near Akron, Ohio.

Robert A. Gibbs, receiver, reported the first week in March that he had an offer of $6,500 for assets of the Columbia Sand and Gravel Co., Hamilton, Ohio.

Creditors and stockholders of the Morris County Sand and Gravel Co., Newark, N. J., were ordered by Federal Judge Fake to show cause by March 5 why assets of the company should not be sold at public auction.

O. N. Holder, Meridian, Miss., has announced plans for opening a gravel pit at Robinson Junction, Miss. The proposed investment includes $12,000 in machinery and equipment to furnish washed gravel for highway construction.

Trial of a $25,000 damage suit brought by Clyde Smith against Consumers Sand Co. as a result of an accident in the summer of 1932, recently was begun in Topeka, Kan. He was riding a cable when his hand was caught in the pulley. For failure to install cable guards the claimant declares the company is guilty of negligence.

Lime

Extensive modernization is reported by the Elliston Lime Co. plant, Elliston, Mont.

Idaho Lime Co. has put a kiln into operation at its plant in Evans, Wash. This is the fifth unit of the battery to be put in operation.

Anticipating a heavy season, officials of the American Lime and Stone Co., Bellefonte, Penn., have recalled a substantial number of employes.

Quarries

Municipal authorities have opened a rock quarry near Riverside, Calif.

Lima Stone Co. properties, Lima, Ohio, was offered at a sheriff's sale, March 17.

Quarry property has been leased by A. W. Hammon to commissioners of Pacific county, Wash. New equipment will be installed.

Fishers quarry, Vancouver, Wash., has reopened its plant to supply about 500,000 tons of rock for jetty projects on the Columbia river.

Steady operation is reported by the Trap Rock Co. plant, St. Croix Falls, Wis.

Citizens of Throckmorton, Tex., are negotiating for rock crushing equipment.

Drilling and rock prospecting recently has gone forward near Mount Pleasant, Ia.

W. L. Thurber, Shell Rock, Ia., has leased city property to the county to use for a stone quarry.

W. M. Gunnison, Middleton, Wis., has placed a lime crushing plant in operation at Melrose, Wis.

John J. Morton Stone Contracting Co. plant, Charlotte, N. C., recently was destroyed by fire.

Davis Lane stone quarry, Youngston, Ohio, was reopened recently in connection with CWA projects.

Local officials in Smith Center, Kan., have applied for a Federal loan to purchase rock plant equipment.

Rock crushing equipment recently was purchased by the Moberly Eight Mile Road District, Moberly, Mo.

Rock quarry north of Ollie, Ia., is the source of material for highway resurfacing on nearby state roads.

Additional rock processing equipment has been authorized for purchase by the city council of Braymer, Mo.

Manager Harry Pinninger has reopened the lime quarry near Williams, Ore. New equipment has been installed.

Contractors have moved rock crushing equipment into the Alcock quarry property near New Hampton, Ia.

County commissioners recently meeting in Rochester, Minn., authorized purchase of stone crushing equipment.

Hudson Township road commission, Macon, Mo., has purchased a rock crusher for use in a limestone quarry nearby.

A new rock quarry has been opened near Atlantic, Ia. The property has been leased by Cass County commissioners.

A hammer mill and other equipment has been ordered by the Illinois Lime Products Co. for its operation near Dallas City, Ill.

Rensselaer County Stone Products Co., Cropseyville, N. Y., in a bankruptcy petition lists liabilities of $27,338 and assets of $23,776.

Wetzel Street quarry near Wheeling, W. Va., has yielded approximately 2,500 tons of limestone used recently for highway improvements.

The village of Barnhill, Ohio, has been sued for alleged damages resulting from the taking of 300 tons of stone from property of the plaintiff.

Rock quarrying is in progress near California, Mo., in connection with river revetment work in charge of the United States Engineering Corps.

Truck and rock crushing equipment have been purchased for use in connection with the stripping and crushing operations conducted by CWA in Marion County, Ia.

Charles McBride, CWA worker on a rock crushing project near Fulton, Mo., recently was injured when he attempted to drive a tractor beneath a conveyor.

About 200 men employed from six different towns, each working 15 hours a week, recently have been employed on rock quarrying projects under county supervision near Marysville, Kan.

CWA workers will replace convicts in two Fulton County rock quarries near Atlanta, Ga., according to E. E. Yantis, county engineer. Under CWA regulations no convict-made material can be used in government-financed work.

Major portion of the 14 CWA projects underway near Hocking, Vinton, Gallia, Morgan, Athens, Meigs, and other nearby Ohio points has consisted of quarrying and crushing limestone for projects in the state's highway division No. 10.

Cement Products

Special metal forms provided by the state are being used by the Logan Cement Block plant in the manufacture of concrete slabs specially for Hocking County projects.

Representatives of the Lewis County Concrete Products Co., Centralia, Wash., recently appeared before officials of the city to negotiate for a test run of water through a concrete pipe line furnished by the company but not yet accepted by the commissioners.

Work on the contract for 8150 ft. of 4-in. pipe and for 3810 ft. of 78-in. pipe produced by the Universal Concrete Pipe Co. for the interceptor sewer near Springfield, Ohio, was completed early in March.

Authorization of concrete pipe instead of vitrified clay pipe has been made by officials of Joplin, Mo. Concrete pipe specified must have a bitumastic coating. Announcement of the change was made by city engineer J. B. Hodgdon.

A hearing recently was held in St. Louis, Mo., for discussion of the relative merits of concrete or tile or vitrified clay pipe for sewer construction. The hearing was held under the auspices of Hugh Miller, state engineer for the Public Works Administration.

Miscellaneous

Laramie Plaster Cement Co., Laramie, Wyo., reports recent theft of $3,000 worth of materials.

Montbestos Co., Idaho Falls, Ida., is the new name of the concern formerly called United Asbestos Co.

Increased export business has been recorded recently for the Zonolite Co., Kalispell, Mont. An order of 150 tons has been shipped to Paris, France.

Additional equipment recently was purchased for the plant of the Southern Rock Asphalt Co. near Sulphur, Okla. A large power shovel was the latest unit to be received and put into operation.

Manufacturers

Link-Belt Co., Chicago, Ill., recently appointed Wilbur G. Hudson as chief engineer of the Pershing Road plant, Chicago. Outside of his work in materials handling, Mr. Hudson has been vice-president and chief engineer of the Curtiss-Wright Airport Corp., in charge of the design and construction of their airports.

W. G. Hudson

G. S. Whyte

Wisconsin Manufacturers' Association has reelected to the organizaton's presidency George S. Whyte, president of the Macwhyte Co., wire rope manufacturer. His election signals the start of his third successive term in office as leader of the state industrialists' organization. Other officers elected at the meeting of the association were: D. E. Everst, vice president; S. G. Scanlan, treasurer, and George Kull, secretary-manager.

Rock Phosphate

Tennessee Valley Authority (TVA) has been taking leases on phosphate-bearing property, 45 in all up to March 1, aggregating about 8000 acres, all taken on the uniform sliding scale basis of 50c per ton royalty for 72% B.P.L., dropping 1c per unit down to 45% B.P.L. One party states that he has been given the right to mine his own rock for shipment to the Authority, taking out the lump rock in the usual hand-mining operation, leaving the fines behind, he to receive cost plus 25c per ton, and the royalty. This will add one very valuable yardstick to the collection going to make up the big yardstick which the TVA will supply from their operations.

When this cost is actually figured up, it will be difficult for anyone to see how the poor hand miners of this field have continued so long to supply lump rock at the figures paid for it by the only large consumer. It is not an extravagant statement to say that, figuring reasonable royalty, compensation for all labor, and fair transportation costs, with amortization and fixed charges, not a ton of rock has been sold from this field in a dozen years that brought the cost of production, much less a profit.

Shipments to fertilizer factories for spring manufacture have about been concluded and it is expected that the phosphate rock industry code will now be shortly put into effect.

No figures can yet be given of a reliable nature, but every indication points to a somewhat larger movement than transpired in the three depression years of '31, '32 and '33, when Tennessee shipments fell below 200,000 tons per annum, but even if they are double, it would be possible to supply such demand, with only a small part of the productive capacity of the larger companies.

The proposed cancellation of the low rates accorded Florida rock via Mobile to Memphis and St. Louis, had created some hope of badly needed increased tonnage for Tennessee, but suspension of this action has again at least deferred any such hope.

Sales of furnace lump for Northern foundry iron furnaces are reported at considerable advances over the price being paid by the only regular consumer of that quality in the South, but so far as learned there has been no advance made by the southern operator.

Some interest is being manifested in the direct application of ground rock, but the unfavorable attitude of experiment stations generally continues to depress the great possibilities which exist for this outlet, which, regardless of all the development that may be made in production of soluble phosphoric acid, is the only real outlet for Tennessee phosphate rock that can ever again bring about any real and lasting activity in this field, as long as Florida rock by preferential water based rates can reach all the manufacturers of superphosphate, including even Knoxville and Memphis, Tenn., cheaper than Tennessee rock can.

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Pembroke Chemical Corp., Fort Meade, Fla., S. D. Gooch, general manager, has begun construction of a phosphate recovery flotation plant.

◈ ◈ ◈

Tennessee Valley Authority has started construction of a plant at Muscle Shoals, Ala., for the manufacture of phosphoric acid and phosphatic fertilizers. Harry A. Curtis is chief chemical engineer. Two electric furnaces are being remodeled. Later a blast furnace will be built. The plant is expected to be completed by July 1. Stone and Webster Engineering Corp. will do the construction work.

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Agricultural Potassium Phosphate Co., Paris, Idaho, C. B. Hayes, manager, reports orders and prospective orders for shipment to Japan, aggregating nearly a quarter of a million tons.

Fifty-one Cement Plants Win Safety Awards

Previous Records Again Exceeded in P.C.A. Contest

By J. B. John,

President, Medusa Portland Cement Co., and Chairman of the Committee on Accident Prevention, Portland Cement Association

ALTHOUGH cement shipments again fell below hopes and expectations, 1933 saw the cement industry sweep to new heights in what has become one of the most important aspects of industrial development—safety. Topping all previous records by a wide margin, the year 1933 produced the most remarkable results in accident-free plant operation in the eleven years since the Portland Cement Association originated its annual safety trophy contests.

Twelve cement mills, never before completing a year's operation without accident, accomplished this feat in 1933, bringing the number of mills that have won the safety trophy to 104. Also, 39 mills which have achieved spotless safety records one or more times before, captured the coveted award again in 1933. Since the beginning of the safety contests, 104 winning mills have earned a total of 235 awards.

Four additional mills had no accidents in 1933, but, owing to reduced operation time, could not qualify for the trophy. These plants have been granted special honorable mention.

In the eleven years since our trophy contest was established, the mills entered in our annual contest have completed about 1800 plant-hours of exposure, during which period there have been a total of 235 accident-free calendar years and half that number of additional accident-free 12-month periods which did not stretch from January 1 to December 31 of a given year. During 1933 about half of the cement plants in the United States which operated finished the year without a lost-time, permanent disability or fatal accident. This is a remarkable record indeed, considering the handicaps resulting from intermittent operation, necessity of holding repair and all other expense to the minimum, and the probability of unusual physical and mental hazards among the workmen as a result of enforced idle periods and reduced income.

Twelve Win for First Time

The twelve cement mills which won the P. C. A. safety trophy contest for the first time and will receive the handsome concrete monument presented to all winners are as follows:

ALLENTOWN PORTLAND CEMENT CO., Evansville, Penn.—D. C. Morgan, Supt. .....*Dec. 3, 1932

ASH GROVE LIME & PORTLAND CEMENT CO., Chanute, Kan.—Guy O. Gardner, Supt.....*July 13, 1932

CUMBERLAND PORTLAND CEMENT CO., Cowan, Tenn.—Frank Pearson, Plant Manager.....**Mar. 20, 1931

DEWEY PORTLAND CEMENT CO., Davenport, Ia.—G. S. Parker, Supt..... .....*Oct. 29, 1932

FLORIDA PORTLAND CEMENT CO., Hookers Point, Fla.—Geo. D. Brown, Supt. .....*Aug. 8, 1932

LEHIGH PORTLAND CEMENT CO., Fordwick, Va.—H. A. Johnson, Supt..... .....*Dec. 21, 1932

LEHIGH PORTLAND CEMENT CO., Mason City, Ia.—O. E. Davis, Supt...*Dec. 1, 1932

LONE STAR CEMENT CO., NEW YORK, Inc., Hudson, N. Y.—John Norvig, Supt. .....*Oct. 3, 1932

MISSOURI PORTLAND CEMENT CO., St. Louis, Mo.—R. Uhlig, Gen. Supt..... .....*Oct. 17, 1932

NEBRASKA CEMENT CO., Superior, Neb.—D. C. Coulson, Supt.....*Dec. 17, 1932

PENNSYLVANIA-DIXIE CEMENT CORP., Clinchfield, Ga.—Floyd Walter, Supt..... .....*July 20, 1932

ST. MARYS CEMENT CO., LTD., St. Marys, Ont., Canada — Norman Johnson, Supt.....*Aug. 5, 1932

*Date of last disqualifying accident.

**Awarded by special action of Committee on Accident Prevention and Insurance for two years' continuous perfect record with 8 months' kiln operation.

Thirty-nine Win Again

Thirty-nine plants which previously won the P. C. A. contest and, in winning again in 1933, are entitled to have new inscriptions placed on their trophies are as follows:

ALPHA PORTLAND CEMENT CO., Birmingham, Ala.—H. O. Underhill, Mgr. (Previous awards for years 1928 and 1930.)

ALPHA PORTLAND CEMENT CO., LaSalle, Ill.—G. Lundberg, Supt. (Previous award for year 1930.)

ALPHA PORTLAND CEMENT CO., Manheim, W. Va.—W. L. Matthes, Supt. (Previous awards for years 1928 and 1930.)

ASH GROVE LIME & PORTLAND CEMENT CO., Louisville, Neb.—A. K. Frolich, Supt. (Previous awards for years 1931 and 1932.)

CALAVERAS CEMENT CO., San Andreas, Calif.—Robt. H. Townsend, Supt. (Previous awards for years 1931 and 1932.)

CANADA CEMENT CO., LTD., Hull, Que., Canada—D. A. Gasper, Supt. (Previous award for year 1927.)

CANADA CEMENT CO., LTD., Exshaw, Alta., Canada—V. C. Hamilton, Supt. (Previous awards for years 1928, 1930, 1931 and 1932.)

DIAMOND PORTLAND CEMENT CO., Middle Branch, Ohio—W. W. Kinginger, Supt. (Previous award for year 1930.)

GREAT LAKES PORTLAND CEMENT CO., Buffalo, N. Y.—A. T. Bevier, Supt. (Previous awards for years 1929, 1930 and 1931.)

HERCULES CEMENT CORP., Nazareth, Penn.—J. Stanley Downs, Supt. (Previous awards for years 1929, 1931 and 1932.)

LEHIGH PORTLAND CEMENT CO., Iola, Kan.—C. A. Swiggett, Supt. (Previous awards for years 1927, 1928, 1929, 1930, 1931 and 1932.)

LEHIGH PORTLAND CEMENT CO., New Castle, Penn.—W. H. Kleckner, Supt. (Previous awards for years 1927 and 1930.)

LEHIGH PORTLAND CEMENT CO., Oglesby, Ill.—John Young, Supt. (Previous award for year 1931.)

LEHIGH PORTLAND CEMENT CO., Sandts Eddy, Penn.—James A. Gish, Supt. (Previous awards for years 1928, 1930 and 1932.)

LEHIGH PORTLAND CEMENT CO., Union Bridge, Md.—G. S. LaForge, Supt. (Previous award for year 1932.)

LONE STAR CEMENT CO. (KANSAS), Bonner Springs, Kan.—E. Struckmann, Gen. Supt. (Previous award for years 1927 and 1932.)

LONE STAR CEMENT CO. (PENNSYLVANIA), Nazareth, Penn.—E. C. Champion, Supt. (Previous award for year 1929.)

LONE STAR CEMENT CO. (TEXAS), Dallas, Tex.—C. J. Lofstedt, Supt. (Previous awards for years 1930 and 1932.)

MEDUSA PORTLAND CEMENT CO., Dixon, Ill.—L. E. Smith, Supt. (Previous award for year 1930.)

MEDUSA PORTLAND CEMENT CO., Manitowoc, Wis.—F. E. Town, Supt. (Previous awards for years 1930, 1931 and 1932.)

MEDUSA PORTLAND CEMENT CO., Toledo, Ohio—W. J. Worthy, Supt. (Previous awards for years 1929, 1930, 1931 and 1932.)

MEDUSA PORTLAND CEMENT CO., Wampum, Penn.—W. P. Rice, Supt. (Previous award for year 1930.)

MEDUSA PORTLAND CEMENT CO., York (Grey), Penn.—R. J. Landis, Supt. (Previous awards for years 1929 and 1932.)

MEDUSA PORTLAND CEMENT CO., York (White), Penn.—R. J. Landis, Supt. (Previous awards for years 1930, 1931 and 1932.)

NORTH AMERICAN CEMENT CORP., Howes Cave, N. Y.—J. W. Campbell, Supt. (Previous awards for years 1930 and 1931.)

OLYMPIC PORTLAND CEMENT CO., Bellingham, Wash.—A. F. Krabbe, Gen. Supt. (Previous awards for years 1931 and 1932.)

PACIFIC PORTLAND CEMENT CO., Redwood City, Calif.—A. G. Lang, Supt. (Previous awards for years 1929, 1930 and 1931.)

PENNSYLVANIA-DIXIE CEMENT CORP., Nazareth, Penn., No. 4—O. D. Newhard, Supt. (Previous award for year 1930.)

PENNSYLVANIA-DIXIE CEMENT CORP., Portland Point, N. Y.—F. P. Werner, Supt. (Previous awards for years 1930 and 1932.)

PENNSYLVANIA-DIXIE CEMENT CORP., Valley Junction, Ia.—R. A. Bechtold, Supt. (Previous award for year 1931.)

SOUTHWESTERN PORTLAND CEMENT CO., Osborn, Ohio—W. T. Groner, Supt. (Previous award for years 1931.)

SOUTHWESTERN PORTLAND CEMENT Co., El Paso, Tex.—H. S. Sparks, Supt. (Previous award for year 1931.)

SUPERIOR PORTLAND CEMENT, INC., Concrete, Wash.—H. A. Ambler, Gen. Supt. (Previous awards for years 1931 and 1932.)

TRINITY PORTLAND CEMENT CO., Fort Worth, Tex.—A. A. Chaney, Supt. Previous awards for years 1930, 1931 and 1932.)

UNIVERSAL ATLAS CEMENT CO., Duluth, Minn.—Ray S. Huey, Supt. (Previous awards for years 1925, 1927, 1929 and 1932.)

UNIVERSAL ATLAS CEMENT CO., Independence, Kan.—C. M. Carman, Supt. (Previous awards for years 1931 and 1932.)

UNIVERSAL ATLAS CEMENT CO., Universal, Penn.—R. L. Slocum, Supt. (Previous awards for years 1930 and 1932.)

WABASH PORTLAND CEMENT CO., Osborn, Ohio—Lester E. Palmer, Works Mgr. (Previous award for year 1929.)

WABASH PORTLAND CEMENT CO., Stroh, Ind.—C. A. Moser, Supt. (Previous award for year 1930.)

Total number of reawards—37

Honorable Mention

The following plants operated during 1933 without disqualifying accident but for too short a period to entitle them to trophy awards. Therefore, the Committee on Accident Prevention of the Association is awarding them honorable mention:

GEORGIA CEMENT AND PRODUCTS CO., Rockmart, Ga.—H. B. Clark, Gen. Supt.

HURON PORTLAND CEMENT CO., Wyandotte, Mich.—H. A. Browne, Supt.

NORTH AMERICAN CEMENT CORP., Catskill, N. Y.—G. A. Witte, Supt.

SUPERIOR PORTLAND CEMENT, INC., Seattle, Wash.—N. H. Nelson, Supt.

Association Again Wins Holmes Award

In acknowledgment of its splendid safety work and the excellent safety record of its member mills again in 1933, the Joseph A. Holmes Safety Association, conducted by officials of the United States Bureau of Mines, has again awarded its annual certificate to the Portland Cement Association.

The association prizes this acknowledgment of its safety efforts very highly. This distinguished citation was previously given to the P. C. A. in 1930 and 1932. In notifying the Portland Cement Association, Scott Turner, president of the Joseph A. Holmes Safety Association and director of the United States Bureau of Mines, said:

"I wish to congratulate your association for its noteworthy achievement in safety. Performances of this kind indicate that plants can be operated with comparative freedom from accidents, and thus give us all new hope that in the future the accident rates in mineral industries will continue to decrease."

Warsaw Heads Industrial Sand Division of N. S. G. A.

MEMBERS of the industrial sand industry met at the Mayflower Hotel, Washington, D. C., March 22, and organized officially as the Division for Industrial Sands under the code of the Crushed Stone, Sand and Gravel, and Slag Industries. A. Warsaw, president of the Wedron Silica Co., Chicago, Ill., was elected chairman of the division, which is to represent approximately 300 producers throughout the country. Signed up under the division at the present time are over 100 producers representing at least 90% of the capacity for this division of the sand producing industry.

A divisional committee of 38 members was elected to function under the leadership of Chairman Warsaw, Executive-Secretary V. P. Ahearn, Treasurer L. M. Hansen and Assistant Treasurer J. R. Boyd. Offices of the division are in V. P. Ahearn's office in the Munsey Building, Washington, D. C.

To function for the general committee, six sub-committees, each consisting of a vice-chairman and two members, were appointed. For the glass and other melting sand section of the division, the committee appointed was W. J. Woods, Lewiston, Penn.; A. C. Goodnow, Chicago, Ill.; E. J. Beyer, Rockwood, Mich. For the bonded foundry sand section: A. J. Miller, New York, N. Y.; J. F. Pettinos, Philadelphia, Penn., and H. M. Rose, Lancaster, Ohio. For the unbonded foundry sand section: Mark McKee, Detroit, Mich.; J. H. Whitehead, New York, N. Y., and D. W. Bryant. For the blasting sand section: P. S. McDougall, Ottawa, Ill.; H. Haddow, Jr., Millville, N. J., and P. A. Snyder, Akron, Ohio. For the "traction, filter and miscellaneous" section of the industrial sand division: G. P. Allen, Toledo, Ohio; C. R. Wolf, Millville, N. J., and Corwin Mathews.

Otho M. Graves, chairman of the national code authority of the industry, addressed the meeting of industrial sand producers before their own discussions got under way. The meeting was also addressed by Assistant Deputy Administrator Plympton of the NRA, who assisted producers in the formulation of resolutions, etc., adopted for guidance of the group as to general policies. They did not commit themselves, however, to any definite stand on the question of open price and other matters still being worked out through the general code organization for the whole industry. Committees were appointed to study uniform sales policy, trade practice policy and safety standards of division members.

It was agreed at the meeting that the divisional assessment should be at the rate of three mills per ton of sand per year, based on the average annual production during the 5-year period from 1928 to 1932, inclusive. Members present at the meeting generally expressed approval of government coöperation in the formation of this division, which will permit specialty producers to work out their own problems so far as the code is concerned.

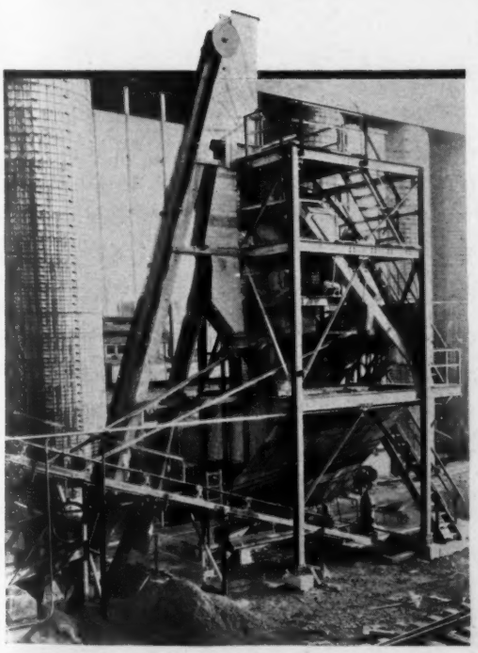
Contract Prices

Cincinnati, Ohio: Contract awarded North Cincinnati Sand and Gravel Co. for 6000 tons of washed fine sand at $1.35; George L. Back, Inc., 6000 tons of washed concrete sand at $1.15; John Mueller Co., 5000 tons of lake sand at $2.22½.

Elyria, Ohio: County commissioners contracted for 5000 tons of slag from National Tube Co. for $1.35 per ton.

Lexington, Ky.: County highway officials recently contracted for small order of sand from Ohio River Sand Co. at $1.00 per ton.

S-A Equipment Pays



The compact screening and rinsing section of the gravel plant recently completed by Stephens-Adamson for the Lake Erie Mining Co. The two S-A Vibrator Screens shown can wash and screen five sizes of aggregate for the Lake Erie concrete batching plant, which was also equipped by S-A.

If you would like to cut your screening, washing or handling costs, call or write for an S-A engineer. He will study your deposit, plant, and every local condition. Then he will make an honest recommendation for any equipment or changes necessary to improve your product and cut operating and handling costs.

You can depend upon every conveyor, screen, washer, etc., and every gravel, stone or batching plant designed and built by Stephens-Adamson. Every unit and every plant is the result of over 30 years of experience and hundreds of successful installations.

S-A "Pacific" belt conveyor carriers, with all-steel rollers and Timken bearings.

Write Today for literature describing S-A equipment. Catalog 34 illustrates S-A equipment for sand, gravel and stone plants. The Concrete Batching Plant Catalog shows how the successful S-A plants are equipped. The Vibrator Screen Catalog describes the well-known "normal-duty" and "heavy-duty" Vibrator Screens.

Stephens-Adamson Mfg. Co.

LOS ANGELES, CALIF. AURORA, ILL. BELLEVILLE, ONTARIO

Conveyors—Screens—Washers—Complete Plants

Straight, clean shot holes with TIMKEN BITS

TIMKEN Rock Bits drill fast, straight and true and hold their gauge longer because (1) they are correctly designed (2) they are made of Timken fine grained electric furnace steel (3) they are scientifically heat treated.

And when the driller replaces a Timken Bit, the new one does just as good a job of drilling as the one it replaced. That's one of the big advantages resulting from the elimination of re-forging.

Every time steel is re-heated it loses some of its penetrative and wear-resistant qualities. That's why the performance of Timken Bits is so much more uniform. Furthermore, Timken Bits can be re-ground without materially decreasing their wear-resistance.

Even if you used Timken Rock Bits solely for their greater drilling efficiency and time-saving you would be money ahead, but there are other valuable benefits to be considered. These include greatly reduced investment in steels and saving of re-forging and transportation charges. Try Timken Bits on your next job—the tougher the better —and prove their economies for yourself.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BITS

THE AIR ROADS ARE ALWAYS OPEN

"SKY-TRACKS" FOR BOULDER DAM

The World's Heaviest Duty Permanent Cableway—150 Ton Capacity

HIGH above the Black Canyon of the Colorado River man has stretched a slender web of steel—built "Sky-Tracks" across the abyss that for centuries seemed impassable. The Lidgerwood Cableways—essential to the completion of Boulder Dam—represent spans of from 1365 to 2575 feet. To assure maximum service and economy—they are equipped with American Steel & Wire Company Track Cables. With breaking strengths in excess of 500 tons each—they enable safe and rapid movement of materials and supplies. In connection with your own aerial transportation problem—whether it be large or small—you will find American Steel & Wire Company quality and service of exceptional value. We invite you to correspond with us.

1831

1934

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94 Grove Street, Worcester

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Export Distributors: United States Steel Products Company, New York

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

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Harnischfeger Corp.
Koehring Company, Div. of National Equipment Corp.
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
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Pennsylvania Crusher Co.
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Bucyrus-Erie Co.
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Use Flex-Mor for troublesome short-center drives. Replace long-center drives and conserve space while reducing transmission losses. Flex-Mor is durable; the silent, elastic drive reduces bearing pressures and requires no dressing or lubricant; unaffected by dust, dirt, moisture or atmospheric conditions.

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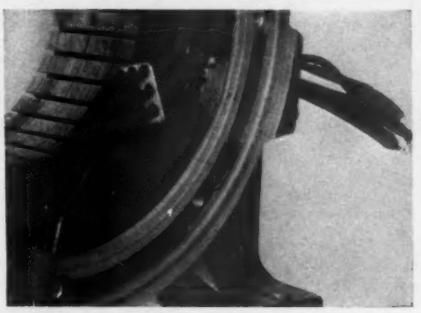
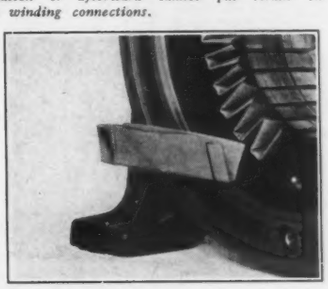
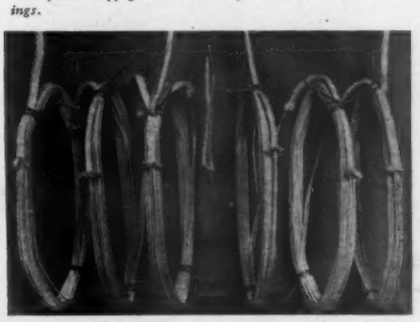


Sealed-in leads. Through an opening in the frame—and there anchored permanently with a special sealing compound. The roughest kind of handling during installation or afterward cannot put strain on the stator winding connections.



Special cuff insulation. Empire cloth inside of two special pre-formed fibrous sheets is inserted in the stator core slots. An ingenious method of folding makes a self-locking cuff and gives permanent protection from slippage and added protection to the windings.



Group wound coils. A phase group winding from one piece of wire—reduces end connections and eliminates a source of mechanical failure. Lead connections from these phase windings are WELDED, not soldered or brazed. An innovation in winding construction that keeps motors out of the repair shop.

Every motor is given a thorough vibrometer test to make sure of proper running balance. Eliminate vibration and you can reduce to a minimum the wear on bearings. Sealed ball bearings and smooth running insure trouble-free service from F-M Motors under severest operating conditions.

5815 EA 22.29

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Engines (Diesel)
Fairbanks, Morse & Co.
Ingersoll-Rand Co.
Nordberg Mfg. Co.
Worthington Pump & Machy. Corp.

Engines (Gas, Kerosene, Oil)
Fairbanks, Morse & Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Company, Div. of National Equipt. Corp.

Excavators (Dragline)
Koehring Company, Div. of National Equipt. Corp.

Fans (Exhaust)
Jeffrey Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Jeffrey Mfg. Co. (Pan and Tube)
Pioneer Gravel Equipt. Mfg. Co.
Robins Conveying Belt Co.
Smith Engineering Works (Plate)

Flights
Cross Engineering Co.

Forging Furnaces
Worthington Pump & Machy. Corp.

Forgings (Steel)
Manganese Steel Forge Co.,

Forges (Oil)
Gardner-Denver Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
United States Rubber Co.

Gears and Pinions
Chain Belt Co.
Link-Belt Co.

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.

Generating Sets (Diesel Electric)
Fairbanks, Morse & Co.

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.

Grinding Balls
Babcock & Wilcox Co.

Grizzlies
American Manganese Steel Co.
Jeffrey Mfg. Co. (Vibrating)
Manganese Steel Forge Co.,
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Hammer Drills
Gardner-Denver Co.

Hammer Mills (See Crushers)

Heat Treating Machines, Automatic (for Drill Steel)
Worthington Pump & Machy. Corp.

Hoists
Gardner-Denver Co.
Harnischfeger Corp.
Ingersoll-Rand Co.
Link-Belt Co.
Northwest Engineering Co.
Pioneer Gravel Equipt. Mfg. Co.

Hoppers and Spouts
Hendrick Mfg. Co.
Manganese Steel Forge Co.,

Hose (Water, Steam, Air, Drill, Sand Suction and Discharge)
Ingersoll-Rand Co.
United States Rubber Co.

Hydrators
Blaw-Knox Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lamp Guards
Flexible Steel Lacing Co.

Lighters (Hot Wire for Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Co.
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
United States Rubber Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Robins Conveying Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel)
The Fate-Root-Heath Co.
Plymouth Locomotive Works
Whitcomb Locomotive Co.

Locomotives (Diesel-Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works
Whitcomb Locomotive Co.

Locomotives (Electric)
Jeffrey Mfg. Co.

Locomotives (Gas Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works
Whitcomb Locomotive Co.

Locomotives (Oil Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works
Whitcomb Locomotive Co.

Locomotives (Steam, Gas and Electric)
Plymouth Locomotive Works (Gas)
Whitcomb Locomotive Co.

Locomotives (Storage Battery)
Jeffrey Mfg. Co.
Whitcomb Locomotive Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Gulf Refining Co.

Lubricants (Wire Rope)
American Steel & Wire Co.
Macwhyte Co.

Machinery Guards
Harrington & King Perforating Co.

Manganese Steel
Manganese Steel Forge Co.,

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co.,

Manganese Steel Parts
American Manganese Steel Co.
Manganese Steel Forge Co.,

Mechanical Rubber Goods
United States Rubber Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Knickerbocker Company.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
F. L. Smidth & Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Concrete)
Koehring Company, Div. of National Equipt. Corp.

Motor Trucks
General Motors Truck Co.

Motor Truck Scales
Fairbanks, Morse & Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
Harnischfeger Corp.

Nozzles (Gravel Washing)
Binks Mfg. Co.
Chain Belt Co.

Oil Burners
Babcock & Wilcox Co.

Oils (Lubricating)
Gulf Refining Co.

Packing
United States Rubber Co.

Packings (Pump, Valve, Etc.)
United States Rubber Co.

Pavers
Koehring Company, Div. of National Equipt. Corp.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plate (Double Corrugated)
Hendrick Mfg. Co.

Plate Work
Hendrick Mfg. Co.

Plates
Cross Engineering Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Fuller Company
Link-Belt Co.
Robins Conveying Belt Co.
Stephens-Adamson Mfg. Co.

Portable Crushing and Screening Unit
Pioneer Gravel Equipt. Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Power Units
Fairbanks, Morse & Co.

Power Transmission Equipment
Chain Belt Co.
S K F Industries, Inc.

Pulverizer Parts
American Manganese Steel Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Dixie Machy. Mfg. Co.
Jeffrey Mfg. Co.
Knickerbocker Company.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Universal Crusher Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Ingersoll-Rand Co.
Fuller Co.
Worthington Pump & Machy. Corp.

Pumps (Cement)
Fuller Co.

Pumps (Cement Mill)
Worthington Pump & Machy. Corp.

Pumps (Cement Slurry)
American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
Ingersoll-Rand Co.
Morris Machine Works
A. R. Wilfley & Sons
Worthington Pump & Machy. Corp.

Pumps (Drainage)
Fairbanks, Morse & Co.
Worthington Pump & Machy. Corp.

Pumps (Dredging)
American Manganese Steel Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Ingersoll-Rand Co.
Morris Machine Works
A. R. Wilfley & Sons

Ready-Mixed Concrete (Truck Mixer Bodies)
Chain Belt Co.

Ready-Mixed Concrete Plants
Blaw-Knox Co.

Road Machinery
Good Roads Machy. Corp.
Harnischfeger Corp.
Koehring Company, Div. of National Equipt. Corp.
Marion Steam Shovel Co.
Northwest Engineering Co.
Whitcomb Locomotive Co.

Rock Drills (See Drills, Rock)

Rock Hammers
Worthington Pump & Machy. Corp.

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
S K F Industries, Inc.
Timken Roller Bearing Co.

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Sand Drag
Smith Engineering Works

Sand Separators
Pioneer Gravel Equipt. Mfg. Co.

Sand Settling Tanks
Link-Belt Co.
Pioneer Gravel Equipt. Mfg. Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.

Scales (Automatic Proportioning)
Fairbanks, Morse & Co.

Scales (Cement)
Fairbanks, Morse & Co.

Scales (Railway Track and Truck)
Fairbanks, Morse & Co.

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.
Northwest Engineering Co.
Pioneer Gravel Equipt. Mfg. Co.
Sauerman Bros

Screens
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bartlett, C. O., & Snow Co.
Chicago Perforating Co.
Cross Engineering Co.
Good Roads Machy. Corp.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Manganese Steel Forge Co.,
Morrow Mfg. Co.
Pioneer Gravel Equipt. Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co.
Traylor Eng. & Mfg. Co.
Universal Crusher Co.
Universal Vibrating Screen Co.

Screens (Perforated)
Hendrick Mfg. Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Testing)
Hendrick Mfg. Co.

Screens, Vibrating
Jeffrey Mfg. Co.
Link-Belt Co.
Pioneer Gravel Equipt. Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

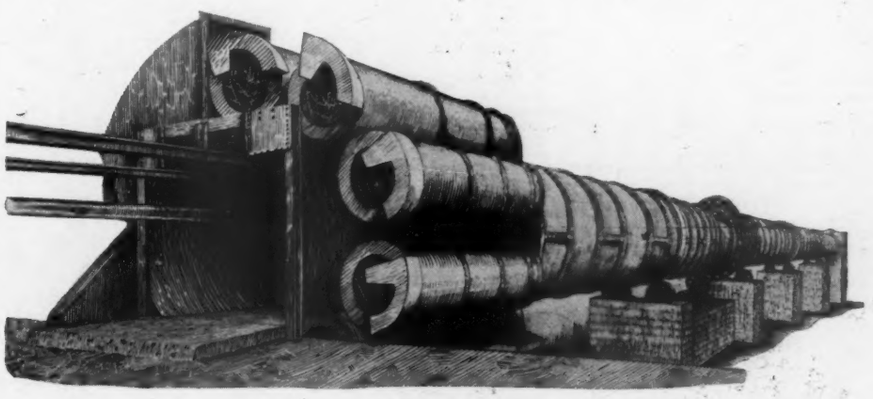
Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

MODERNIZE TO REDUCE COSTS

An Example:—

● A modern **UNAX KILN** recently installed by a certain cement manufacturer reduced the coal consumption 30 pounds per barrel of cement burned as compared with the coal consumption in their other kilns.

● As the average daily capacity of this new **UNAX KILN** is approximately 2,350 barrels, a saving is made of 70,500 pounds of coal per day, or 23,265,000 pounds of coal per year of 330 working days for this production.



● The other kilns at this plant on which this comparison is based are not obsolete but are quite long and they in turn replaced shorter kilns effecting a saving of approximately 20 pounds of coal per barrel of cement burned. If comparing the new **UNAX KILN** with the short kilns, the saving would have been approximately 50 pounds of coal per barrel, or 38,775,000 pounds per year.

● In addition to the saving in fuel, a better and more uniform clinker is produced, more easily grindable and a higher quality of cement is obtained.

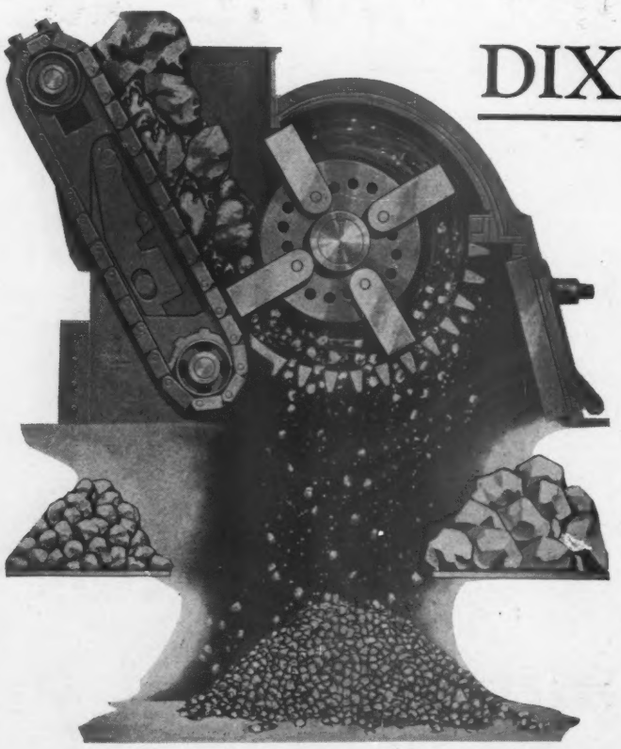
F. L. SMIDTH & CO.

225 BROADWAY NEW YORK, N. Y.

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Screw, Rewasher (Single and Twin)
Smith Engineering Works
Scrubbers
Knickerbocker Company.
Seal Rings
Traylor Eng. & Mfg. Co.
Separators (Slurry)
F. L. Smidth & Co.
Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Company
Harnischfeger Corp.
Koehring Company, Div. of National Equipment Corp.
Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Ohio Power Shovel Co.
Silos
F. L. Smidth & Co.
Skip Hoists and Skips
Link-Belt Co.
Robins Conveying Belt Co.
Slings (Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.
Sockets (Wire Rope)
American Steel & Wire Co.
Soft Stone Eliminator
Knickerbocker Co.
Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Spouts, Chutes (See Chutes and Chute Liners)
Spray Nozzles
Binks Mfg. Co.
Sprockets and Chain
Chain Belt Co.
Jeffrey Mfg. Co.
Steam Shovel Repair Parts
American Manganese Steel Co.
Steel Bars
Timken Roller Bearing Co.
Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.
Steel (Electric Furnace)
Timken Roller Bearing Co.
Steel (Open Hearth)
Timken Roller Bearing Co.
Steel (Special Alloy)
Timken Roller Bearing Co.
Steel (Special Analysis)
Timken Roller Bearing Co.
Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.
Tanks
Combustion Engineering Corp.
Link-Belt Co.
Hendrick Mfg. Co.
Tanks (Sand Settling)
Pioneer Gravel Equipt. Mfg. Co.
Tires and Tubes
United States Rubber Co.
Tools (Pneumatic)
Ingersoll-Rand Co.
Track Equipment
Easton Car & Const. Co.
Nordberg Mfg. Co.
Track Shifters
Nordberg Mfg. Co.
Tractors
Koehring Company, Div. of National Equipt. Corp.
Tramways (Aerial Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.
Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.
Trippers
Robins Conveying Belt Co.
Troughs
Cross Engineering Co.
Truck Bodies (Quarry)
Easton Car & Const. Co.
Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.
Trucks and Trailers (See Motor Trucks)
Truckmixers
Blaw-Knox Co.
Tube Mills (See Mills, Ball, Tube, etc.)
Tube Mill Liners (See Mill Liners)
Tubing (Blasting)
United States Rubber Co.
Tubing (Seamless Steel)
Timken Roller Bearing Co.
Underground Shovels
Nordberg Mfg. Company
Valves (Pump)
United States Rubber Co.
Vibrating Screens (See Screens, Vibrating)
Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Knickerbocker Co.
Link-Belt Co.
Pioneer Gravel Equipt. Mfg. Co.
Traylor Eng. & Mfg. Co.
Waste Heat Boilers
Combustion Engineering Corp.
Weighing Equipment
Fairbanks, Morse & Co.
Weigh-Mix
Koehring Company, Div. of National Equipt. Corp.
Welding and Cutting Apparatus
Harnischfeger Corp.
Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.
Manganese Steel Forge Co.,
Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.
Wire (Managese Steel)
Manganese Steel Forge Co.,
Wire (Rubber Insulated)
United States Rubber Co.
Wire Cloth
Manganese Steel Forge Co.,
John A. Roebling's Sons Co.
Wire Rope
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.
Wire Rope Fittings
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.
Wire Rope Slings (See Slings, Wire Rope)
Wire Rope Sockets (See Sockets, Wire Rope)



DIXIE HAMMERMILLS

Are doing *big things* these days

These machines are playing an important part in meeting the demands of State and Federal Government projects. They are helping producers stage a real comeback by tackling the toughest crushing, pulverizing and grinding jobs and returning a substantial profit.

The specially designed, continually moving breaker plate solves the problem of reducing soft and sticky material.

The life of the movable breaker plate is extended to 26 times the wearing life of an ordinary stationary breaker plate.

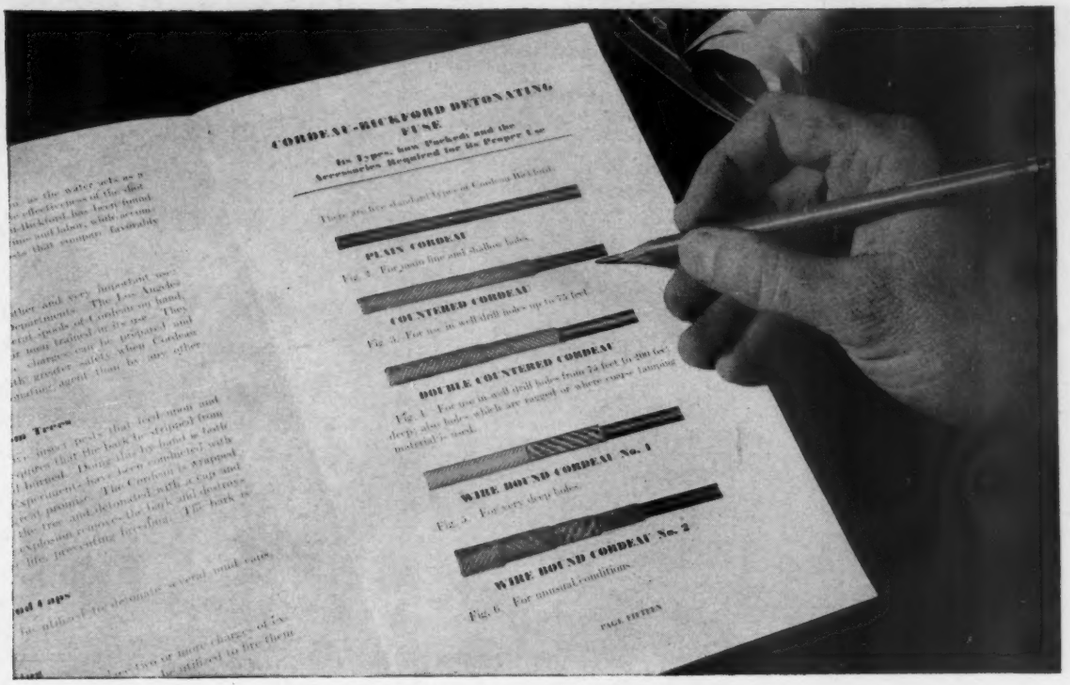
Dixie Hammermills are made in 40 sizes and in capacities to meet a wide range of requirements.

for CEMENT.....GYPSUM...
CLAY....SHALE....SAND...KAOLIN
IRON ORE...ROCK...BARYTES, *etc.*.

DIXIE MACHINERY MFG. CO.

4209 Goodfellow Ave. **St. Louis, Mo.**

Eastern Office: 104 Pearl St., New York City; Western Office: 3690 Santa Fe Ave., Los Angeles, Calif.



Use the right CORDEAU *for the job*

Use Plain Cordeau for hooking up the holes above ground, and Countered Cordeau for the holes themselves. The size and depth of the hole will determine the type of Cordeau needed.

Five types are available: Plain, the lead sheath being without reinforcement; Countered, with one wrap of cotton yarn; and Double Countered. For very deep holes and other unusual conditions we recommend Wire Bound Cordeau, No. 1 or No. 2.

The proper use of Cordeau insures quicker, easier, and generally more profitable work. It is an *insensitive* detonator, and must be detonated with a fuse cap or an EB Cap. Its use simplifies loading. And because the Cordeau itself detonates *each and every* cartridge, you get *more* work from the explosives, and *better* fragmentation.

SAFETY FUSE AND LIGHTERS

Ensign-Bickford Safety Fuse is available in a number of standardized brands, each carefully made for a particular set of conditions. The use of Safety Fuse simplifies blasting technique. Send for booklet.

Also — there are a number of Ensign-Bickford Lighters, inexpensive—and positive in action. Send for booklet.

There is a new technique in blasting, which brings new economies to operators everywhere. It is explained and illustrated in the Cordeau Book — free to executives.

CORDEAU
DETONATING FUSE
BICKFORD

CB29

THE ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut

"What Is The Best Type Of Compressor For Quarries?"

"Give us a compressor we can move to new workings quickly—one that can be moved set up, that is ready for use any time and doesn't need an elaborate foundation." Quarry men came to Gardner-Denver with that request. They found that Gardner-Denver Vertical Water-Cooled Compressors are *especially designed* for just such conditions.

Gardner-Denver Vertical Water-Cooled Compressors with capacity up to 500 cu. ft. per minute are exceptionally compact, rugged and self-contained units. Mounted on skids, they can be moved quickly and easily. No heavy foundation is needed—just set them down anywhere and they are ready for work.

For your quarry, invest in our skid-mounted compressor. The price is low, and installation costs are eliminated. Write us for complete information.

GARDNER-DENVER CO.
104 Williamson St. Quincy, Ill.

Horizontal, Vertical, Air-Cooled and Portable Compressors • Steam and Power Pumps
Rock Drills, Accessories • Paving Breakers • Clay Diggers • Hoists

GARDNER-DENVER
MAKES AIR DO MORE AND COST LESS

WHERE EVERY DOLLAR HAS MORE CENTS

Every dollar invested in ROL-MAN Manganese Steel Screens returns maximum profits on the investment.

REASON No. 1 **ROL-MAN SCREENS outlast ordinary screens many times because made of wear-resisting manganese steel. This also means long uninterrupted service—minimum maintenance and lowest cost per ton.**

REASON No. 2 **Capacity is greatly increased because of the rapid and thorough screening action and the relatively large percentage of open space.**

REASON No. 3 **The Patented Double-Lock Mesh feature maintains an absolute accuracy of separation during the entire life of the screen.**

FURTHER PROOF

Installation in hundreds of plants have proven the positive economy of ROL-MAN Manganese Steel Screens. Their unusually high efficiency and other operating advantages have been recorded under the most exacting service conditions over a period of more than thirteen years.

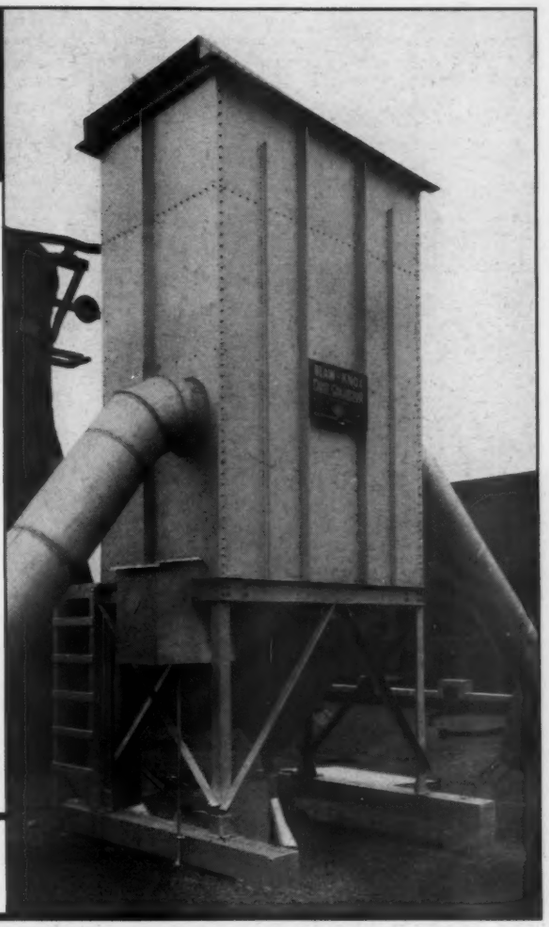
ASK FOR NEW LOW PRICES and LITERATURE ON

ROL-MAN
MANGANESE STEEL
SCREENS

Write to

MANGANESE STEEL FORGE CO.
Richmond St. and Castor Ave. Philadelphia

Blaw-Knox DUST COLLECTORS



save your valuable by-products

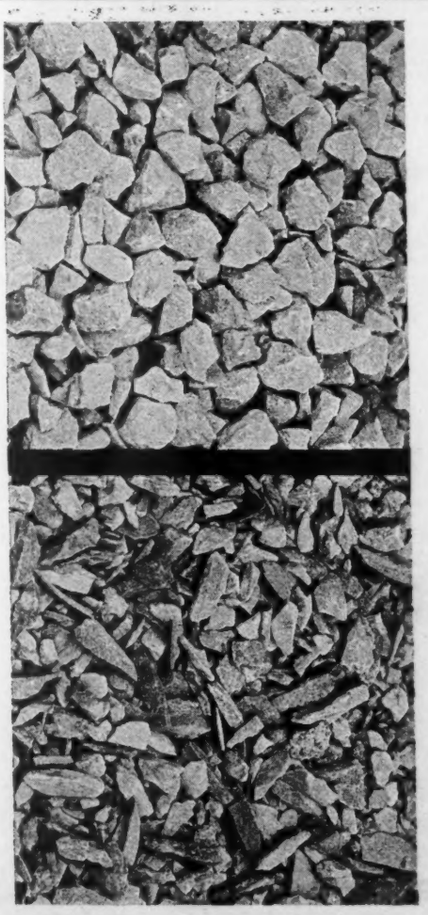
Are you throwing away those by-products which command premium prices—such as Asphalt Filler, Agricultural Limestone, Air Floated Fillers, and Rock Dusting Material?

Only those crushing plants equipped with a real DUST COLLECTING SYSTEM are in a position to reap these by-product profits.

Let a Blaw-Knox Engineer show you how this can be done. An analysis will not obligate you.

BLAW-KNOX COMPANY
2035 Farmer's Bank Bldg. Pittsburgh, Pa.
Offices in Principal Cities

BLAW-KNOX



No Slivers

If you are getting "kicks" on slivers or slabby stone, your difficulties can be overcome with a Williams Hammer Crusher. The photos to the left tell the story. Both were made from the same rock, the only difference being in the type of crusher used. Note the approximately cubular shape of the product at the top made by a Williams, "not a sliver in a carload." The bottom sample was made with another widely used type of crusher. Thirty sizes of Williams Hammer Crushers. Larger types crush power shovel loaded rock to 1¼-inch, smaller sizes handle hand loaded stone or screen rejects. Write us.

Williams Patent Crusher & Pulverizer Co.

800 St. Louis Ave. St. Louis, Mo.

Chicago 37 W. Van Buren St. | New York 15 Park Row | San Francisco 326 Rialto Bldg.

REG U.S. PAT. OFF. THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS TRADE MARK

Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

PATENT CRUSHERS GRINDERS SHREDDERS

Make Your Sand "COME CLEAN"

Complete assembly of Jeffrey Sand Settling Tank, showing Drive Side and Discharge End. Note the rigid bracing of this tank.

With Jeffrey Sand Settling Tanks

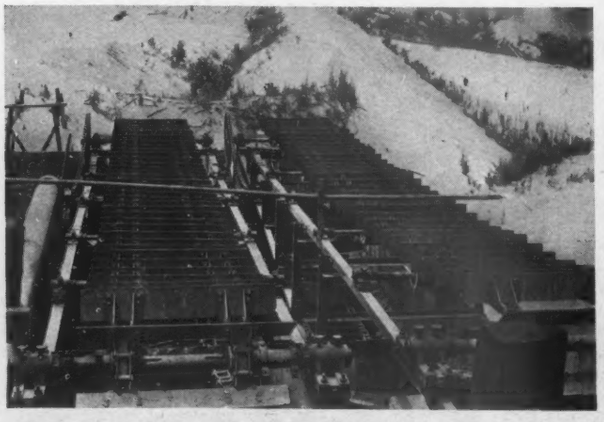
Contractors, highway engineers and inspectors are insisting upon clean sand. Result: Clean sand commands a higher market price.

Jeffrey Sand Settling Tanks will enable any sand and gravel plant to produce sand commercially free from vegetable matter, clay and loam. Because of their simplicity they function continuously without supervision. Material is delivered from washing screens to the tank, where it is held in suspension in the water. The sand settles to the bottom and is carried out by scraper flights—dirt and silt, which is lighter, goes out with the water thru the overflow.

By operation of tanks in series, a final product of almost any grading may be obtained.

We will be glad to tell you how Jeffrey Sand Settling Tanks may be of service to you. Write today.

The Jeffrey Manufacturing Company
935-99 North Fourth Street Columbus, Ohio
District Offices in Principal Cities



This illustration shows two Jeffrey Sand Settling Tanks, with steel tanks, operating side by side in a large producing plant.

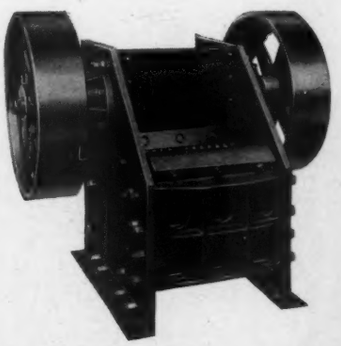
ALLIGATOR
TRADE MARK REG. U.S. PAT. OFFICE
STEEL BELT LACING
NEARLY a thousand belts per hour are laced with Alligator Steel Belt Lacing, day in day out, year in year out. Easy, rapid application with a hammer as the only tool; the hammer-clinched, vise-like grip on the belt ends, preventing friction of the plies; the patented, sectional, steel rocker pin which absorbs friction in the hinged joint; the great surplus of strength and long service—only Alligator Steel Belt Lacing combines these features which make it the choice of millions of belt users. Smooth on both sides. Easily separable. Reliable both on light and heavy duty drives. Eleven sizes. Made also in Monel Metal. Sold at wholesale and retail throughout the world.
FLEXIBLE
STEEL LACING CO.
4684 Lexington Street, Chicago
In England at 135 Finsbury Pavement, London, E. C. 2
JUST A HAMMER TO APPLY IT"

GOOD ROADS CHAMPION ROCK CRUSHERS

Bucket Elevators, Conveyors,
Revolving and Vibrating Screens,
Scrubbers, Wash Boxes, Feeders, etc.

EXPERT ENGINEERING SERVICE

In addition to the old reliable Champion and Climax Crushers, a complete line of roller bearing reduction crushers of most improved design and construction—No. 1030 illustrated.

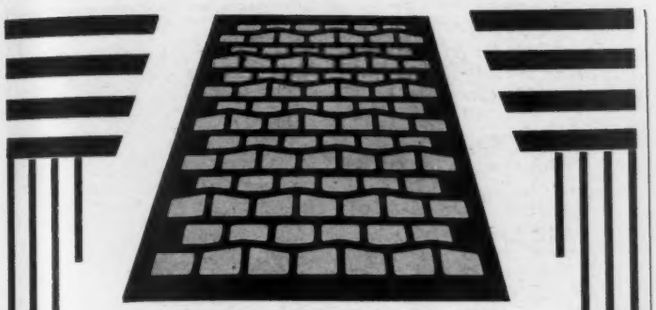


OTHER PRODUCTS

Road Graders, Drags, Road Oil Distributors, Sand and Chip Spreaders

Ask for literature

GOOD ROADS MACHINERY CORP.
KENNETT SQUARE, PA.



INDENTED VIBRATING SCREEN PLATE

CROSS
SCREEN PLATES
FOR ALL TYPES OF SCREENS

These plates are of the very finest perforated metal and are available in all sizes of

ROUND—SQUARE AND SLOT PERFORATIONS.

CROSS Screen Plates result in greater uniformity in sizing—larger capacity and reduced operating cost. There is far less blinding and because CROSS Screen Plates wear longer, an additional saving is effected.

No matter what your screening problem—no matter how unusual or severe—we can suggest just the right CROSS Screen Plates to meet your requirements efficiently and economically.

Modern manufacturing facilities enable us to offer prompt service at reasonable cost. See us before placing that next screen order.

Write for our attractive bulletin TODAY.

CROSS

CROSS ENGINEERING COMPANY

Manufacturing Plant and General Offices:
CARBONDALE - - - - - - PENNSYLVANIA
Representatives in Principal Cities

When Shorter-Hour Crews Call It a Day—

HAVE THEY MADE YOU A PROFIT ?

There's a way around the difficulty . . . Do as others are doing . . . Increase your equipment's efficiency . . . Cut hourly loss . . . Save costly time . . . Get more work done per dollar of operating cost . . . You can do it with

WHITCOMB LOCOMOTIVES

No time lost in starting to work in the morning . . . No stand-by loss . . . No idle crew charges during the day . . . Whitcombs don't have to be "undressed and put to bed" at night . . . Carefully proportioned transmissions that accelerate rapidly and smoothly . . . Whitcomb leads in original, time-saving, cost-saving features.

The new Whitcomb, 12-ton Diesel Mechanical Drive Locomotive . . . clean-cut . . . powerful . . . low center of gravity . . . convenient, accessible . . . reliable, economical.

Whitcomb Locomotives are available in the following classifications:

Internal Combustion—Diesel and Gasoline
- Mechanical Drive—3 to 30 tons
- Electric Drive—30 to 90 tons

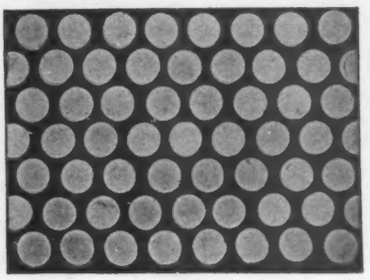
Electric
- Storage battery—2½ to 10 tons
- Trolley—4 to 75 tons
- Combination—8 to 75 tons

Whitcomb sales and service everywhere. Write, phone or wire.

THE WHITCOMB LOCOMOTIVE COMPANY
Subsidiary of The Baldwin Locomotive Works
ROCHELLE ILLINOIS

WHITCOMB LOCOMOTIVES

MORROW SCREEN PLATES

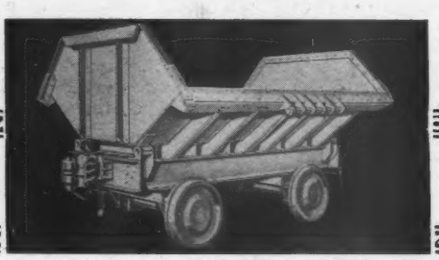


MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

Prices are right.
Send for Bulletin 57.

The Morrow Manufacturing Co.
Wellston, Ohio



EASTON CARS

The Phoenix Car, illustrated above, conceived and patented by EASTON, has the widest application among quarry operations. Other EASTON Cars are designed for certain conditions of loading and side-dumping—end-dumping, etc.

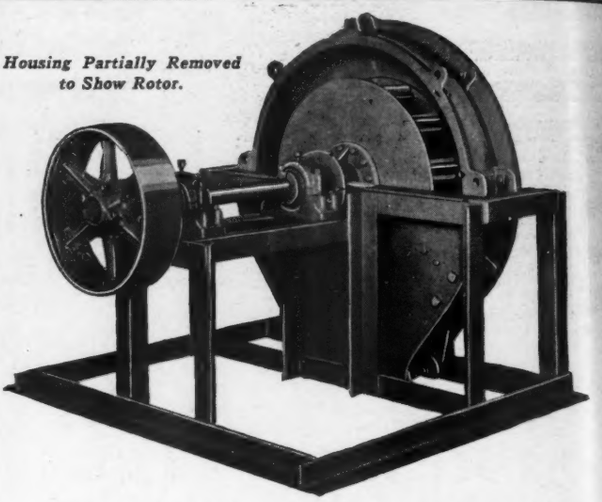
The fact that EASTON CARS are to be found in all parts of America, where quarry operations are in progress, testifies to the leadership enjoyed by these cars in the fields of transportation.

EASTON CARS, like EASTON TRUCK BODIES, are the result of 20 years' active development. Write for the EASTON catalog.

EASTON CAR & CONSTRUCTION CO.

EASTON, PENNA.

Housing Partially Removed to Show Rotor.



Meet "shorter hours and higher wages" with modern equipment. Use this economical outfit to eliminate ochre, sandstone, sailers, chalk, lignite from gravel that otherwise would have to be hand-picked. Ask for circular.

THE KNICKERBOCKER CO., *Jackson, Mich.*

KNICKERBOCKER Soft Stone Eliminator

QUALITY MACHINERY BUILT BY NORDBERG

Crushers for Ore and Rock
Diesel and Steam Engines — Hoists
Compressors — Underground Shovels
Railway Maintenance Machinery

Write for Descriptive Literature

NORDBERG MFG. CO.
MILWAUKEE, WIS.

WILFLEY Centrifugal SAND PUMP

PATENTED

for Slurry
for Sand Tailings

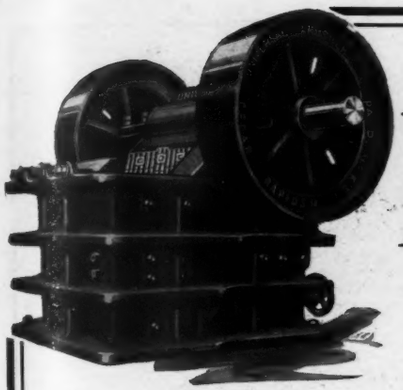
ELIMINATION of stuffing box has done away with many troubles common to centrifugal pumps.

Pump maintains extraordinary efficiency.

Pumping parts unusually heavy, insuring long life. Cleaning out pump or changing wearing parts requires only a few minutes.

Described and illustrated in Catalog No. 8

A. R. Wilfley & Sons, Inc., Denver, Colo., U. S. A.



For Extra Heavy Duty

These powerful UNIVERSAL Crushers are designed for heavy duty in the crushing of quarry rock and gravel where a large receiving opening is required. Their large capacity and low power requirements have made them extremely popular with producers everywhere. The sizes are: 12x20" — 15x20" — 12x24" — 15x24" — 12x36" and 15x36".

The UNIVERSAL line includes everything needed for speedy, efficient, economical crushing, screening and loading.

Write for catalog and let our engineers help solve your problems.

UNIVERSAL CRUSHER CO.

617 C AVENUE WEST... CEDAR RAPIDS, IOWA

Now Available—

"SQROUND MESH" Double Corrugated Plate

Sqround Mesh Double Corrugated Plate offers three distinct advantages:

—The ingenious "square-round" mesh eliminates the oversize which goes through the diagonal dimension of the conventional square mesh.

—Sqround Mesh gives greater accuracy of sizing with very little reduction in open area of the screening surface.

—The tumbling action of double-corrugated plate insures cleaner screening—mighty little undersize goes over double-corrugated plate.

Investigate the advantages—and economy of Sqround Mesh Double Corrugated Plate, especially for vibrating screens.

HENDRICK MFG. CO.

47 Dundaff Street **Carbondale, Pa.**

Baltimore Birmingham Boston Cincinnati
Cleveland Detroit Hazelton New York
Philadelphia Pittsburgh

McLANAHAN PRODUCTS

Single, Double Roll Crushers—Super Dry Pans—Steel Log Washers and Scrubbers—Dryers—Jigs—Screens—Hoists, Elevators and Conveyors—Reciprocating Feeders, Bingates, Chutes, Turn Tables, Elevator Buckets, Car Pullers, Rail Straighteners, Cast Parts, Rough or Finished—Car Wheels and Brake Shoes, Sprockets and Sheaves, Gears and Bearings, Gratings and Columns, Chute Linings, Grate Bars of Special Heat-Resisting Metals.

Write for catalogues listed or for information concerning any of the material, machinery and castings listed, required in mine, quarry or pit.

McLANAHAN & STONE CORPORATION

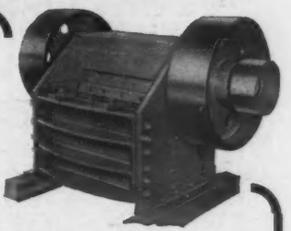
Manufacturers—Founders—Machinists

Hollidaysburg (Established 1835) Pennsylvania

BINKS GRAVEL WASHING NOZZLES
for EFFICIENT & ECONOMICAL SAND AND GRAVEL WASHING
BINKS MANUFACTURING CO.
3108-46 CARROLL AVE. Chicago

THE editorial library of Rock Products contains practically every obtainable treatise relating to the production of stone, sand, silica, phosphate rock, gypsum and other non-metallic minerals and on the manufacture of cement, lime, gypsum products, etc. The editors are technical men and are familiar with these books. Our library of manufacturers' literature is as complete and up-to-date as possible. Rock Products welcomes inquiries, and our facilities are ever at the disposal of our subscribers and advertisers.

GRUENDLER JAW CRUSHER



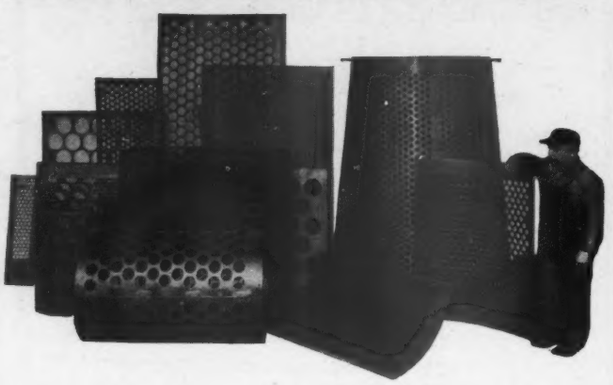
An all-steel model for crushing 5" to 2½" and under. Also available—the GRUENDLER latest type Roller Bearing Crusher where 3" to ½" sizes and under are desired. Other models for fine reduction. Any of these models will effect real savings for you.

WE ALSO MANUFACTURE elevators, revolving screens, conveyors; and design and furnish complete information for entire rock or gravel plants.

GRUENDLER CRUSHER & PULVERIZER CO.

2915 N. Market St. **Dept. R.P.** **St. Louis, Missouri**

SCREENS
of Perforated Metal



For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

The Harrington & King PERFORATING Co.

5650 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N. Y.

CUT YOUR CRUSHING COST

MANY an operator is cutting his crushing costs and maintaining production schedules with this most dependable crusher. Simple but sturdy, this efficiently designed crusher represents an exceptionally profitable investment in equipment of this type.

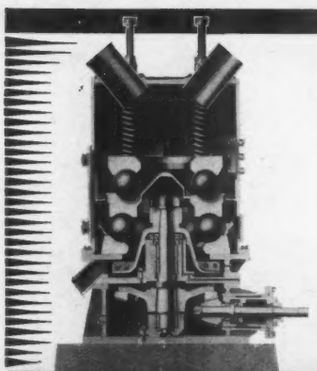
Lewistown Foundry & Machine Company
LEWISTOWN, PENNA.

HAYWARD BUCKETS

A Profit on every job

Using Hayward Buckets exclusively is your best bet for making a profit on all digging and rehandling jobs.

THE HAYWARD CO.
202-204 Fulton St.,
New York, N. Y.



PULVERIZERS

for grinding:
Cement Materials
Phosphate Rock
Limestone
Minerals
Charcoal
Graphite
Shale
Coal

Fuller-Kinyon Transport System for Pulverized Fuel.

THE BABCOCK & WILCOX COMPANY • 85 LIBERTY ST. • NEW YORK

BABCOCK & WILCOX

STEEL

IMMEDIATE SHIPMENT FROM STOCK FOR MAINTENANCE AND REPAIR

When steel is needed in a hurry . . . you can depend upon Ryerson for quick action. Complete stocks of all steel products including bars, plates, sheets, structurals; bolts and nuts, rivets, boiler fittings, chain, etc. Order from the nearest plant. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

"PENNSYLVANIA" STEELBUILT HAMMERMILLS

installed in the largest Cement Plant in the British Empire. Five other plants of the same Company are "Pennsylvania" equipped.

PENN-PRIMARY Hammermills, PENN-LEHIGH PRIMARY ROLLS, PENNSYLVANIA-BUCHANAN Jaw Crushers, "PENNSYLVANIA" Secondary and Fine Reduction Hammermills meet every raw side-crushing need.

Unbreakable Steel Construction
Positive Tramp Iron Protection

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg.
PHILADELPHIA

Put Your Reduction Problems Up to Us New York Pittsburgh Chicago

Perforated Metals — Screens of All Kinds — For Sand, Gravel, Stone, Etc.

MATERIAL IN STOCK
PROMPT SHIPMENT

CHICAGO PERFORATING CO.
2427 to 2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

SAUERMAN SLACKLINE SCRAPERS

Pit Excavation—Stripping —Stock-Piling
Large yardage at low cost.
Operating spans up to 1,000 ft.
Daily Capacities up to 5,000 cu. yd.

SAUERMAN BROS.
430 S. Clinton St.
CHICHAGO

BACON FARREL CRUSHERS

Complete Plants Designed and Equipped.
Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment.
Engineering Service.

EARLE C. BACON, Inc.
17 JOHN STREET NEW YORK, N. Y.

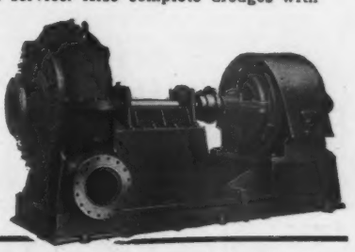
EAGLE EQUIPMENT

Spiral Screw and Log Washers, De-Waterers and Shale Removers, Flume Classifiers, Swintek Ladder Suction Screen Nozzles, Chain Type Cutters, Barges and Pontoons, A Frame and Gantry Hardware, Vibrating and Revolving Screens, Steel Dump Cars, Grizzlies, Car Wheels and Trucks, Steel Bins, Water Tanks, Structural Towers, and Dry Pans.

EAGLE IRON WORKS
Machinists — Founders
DES MOINES, IOWA

MORRIS CENTRIFUGAL PUMPS

For hydraulic dredging, filling, sand and gravel production, hydraulic conveying of slurry and other liquids containing abrasive materials, clear water pumps for general service. Also complete dredges with all accessory equipment. Dredging pump designs include heavy-duty types and special alloy parts for severe service. Types and sizes for the largest or smallest operations, and belt, motor, steam, oil or gasoline-engine drive.



Write for Bulletins

Morris Machine Works
Baldwinsville, N. Y.
Export Office: 30 Church St., New York City

SCREENS

CRUSHERS
DRYERS
SKIP HOISTS
ELEVATORS
BELT CONVEYOR IDLERS
CONVEYORS

● Seven styles, for wet and dry screening, including hexagonal and round, jacketed and not jacketed, wire cloth and perforated plate designs are included in our complete line. Sizes to meet your requirements. Full details on request.

THE C. O. BARTLETT & SNOW CO.
6194 HARVARD AVENUE • CLEVELAND, OHIO

MANGANESE STEEL CASTINGS

for the

Rock Products Industry

On Your Next Inquiry Specify
"INDIAN BRAND"
Known For Its Superior Shock and Wear Resisting Qualities.

The Frog, Switch & Mfg. Co.
Established 1881 Carlisle, Pa.

CLASSIFIED ADVERTISEMENTS

Used Equipment For Sale

ELEVATOR BELT BARGAIN

New 26"-8 ply Goodrich Akron Brand 36 oz. duck belt 1/32" rubber cover both sides offered at greatly reduced price.

CENTRAL RUBBER & SUPPLY CO.
Indianapolis, Ind.

CONSOLIDATED offers GOOD USED CRUSHING, PULVERIZING, DRYING AND FILTERING EQUIPMENT—COMPLETE

Crushing Plants; Diesel, Gasoline, Electric Cranes and Shovels; Hoists; Compressors; Pumps; Dragline and Excavating Equipment; and all sizes and types of Jaw, Gyratory and Roll Crushers; Swing Hammer Mills; Elevators; Belt Conveyors; Rotary and Vibrating Screens; Rotary Kilns and Dryers; Raymond and other fine Pulverizers; Air Separators; Hardinge Ball and Pebble Mills; Silex and iron lined Tube Mills, etc. Send for Bulletin No. 14.

CONSOLIDATED PRODUCTS CO., Inc., 15-16-17 Park Row, New York City
Tel. Barclay 7-0800 Shops and Yards at Newark, N. J., now covers eight acres

(Classified Advertising Continued on Next Page)

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

USED EQUIPMENT

STEAM LOCOMOTIVES ASME BOILERS

60-ton Porter 6-wheel saddle tank.
50-ton American 4-wheel saddle tank.
40-ton American 4-wheel saddle tank. (2 duplicates.)
36-ton Porter 4-wheel saddle tank. (2 duplicates.)
30-ton American 4-wheel saddle tank.

GASOLINE LOCOMOTIVES

50-ton standard gauge Plymouth.
20-ton standard gauge Whitcomb.
8-ton standard gauge Plymouth.
20-ton 36" gauge Plymouth.

BIRMINGHAM RAIL & LOCOMOTIVE CO.
P. O. Box 391,
Birmingham, Alabama

1—13-A Telsmith Gyratory Crusher.
1—P & H Model 600 Shovel 1 yd.
1—¾ Yd. General Shovel-Crane.
1—1¼ Yd. Osgood Gas Shovel.
2—2 Yd. Marion 480 Steam Shovels.
6—20 Yd. Koppel Air Dump cars.
16—6 Yd. Koppel Dump cars.
33—4 Yd. Heavy Steel Stone skips.
12—2 Yd. Steel Stone skips.
18—1½ Yd. 24 and 36" Ga. cars.
1—30" Conveyor 100 ft.
Loco. type boilers: 60, 80, 100 H.P.
Compressors: 610, 1000, 1300 Ft.
Gas Locomotives: 8, 16, 20 ton.
Dryers, Ball Mills, Screens, Conveyors, Loco. Cranes, Asphalt Plants, Draglines, Crushers, Derricks, Hoists, Buckets.
Jaw Crushers 10x18, 15x36, 18x30.

J. T. WALSH
Brisbane Building **Buffalo, N. Y.**

FOR SALE

Farrel Jaw Crusher, type B, 36x42".
Farrel Jaw Crusher, type B, 18x36".
Reliance Jaw Crusher, 9x16", 30' elevator.
80' 8-ply Belt Elev. with 140 30" buckets.
Trough Belt Conveyor, 20" wide, 130' long.
Trough Heavy Duty Belt Conveyor, 32"x80'.
Revolving Stone Screens, 40x18' & 60x20'.
Portable 24" gauge track, 3,000 feet.
American 4" Centrif. Pump, 15 H.P. gasoline.
2-stage Centrif. 8" Pump, 150 HP. A.C. mot.
Elevator Belt, 32" wide, 170' long, 12-ply.
I. R. Steam Driven 2-stage Compressor, 446'.
C. & M. 10-ton geared Cyclone Chainhoist. Electric, gasoline and Steamhoists.
Side Dump Cars, 2 & 4 yd. cap., 36" gauge.

G. A. UNVERZAGT, 15 Park Row, N. Y. C.

FOR SALE

2-50-B Bucyrus combination Shovels and Draglines, 28' booms, 1¾ yd. manganese front dippers, 45 ft. dragline booms, 1½ yd. Page dragline buckets, 36" caterpillar tread. Condition—excellent. Real bargain.

THOMAS F. CAREY CO., INC.
120 Liberty St., New York, N. Y.

USED EQUIPMENT

FOR SALE—Factory Rebuilt Horizontal Buckeye Oil Engines. 1, 65 H.P.; 1, 260 H.P.; 1, 200 H.P. Vertical Buckeye Full Diesel; all engines furnished with or without generators or belt driving equipment. Also 1 50 H.P. reconditioned Muncie Oil Engine. Liberal terms. Write today.
THE BUCKEYE MACHINE COMPANY
Lima, Ohio

Marion Gas Electric ¾-Yard Shovel.
1-Yd. Osgood Crawler Shovel, rebuilt.
Side and Center dump cars.
Locomotives—75-ton Switcher, code boiler—saddle tank type, 18 to 65 tons.
Cranes and Draglines, various sizes.

SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Georgia

BUSINESS OPPORTUNITIES

GOLD—SILVER—GOLD

The present high price of gold has opened new opportunities. Before you put some of your equipment to work on a gold or silver property let me give you the benefit of my 15 years' practical experience in mining. The undersigned is available to examine and report on gold or silver properties, placer, drift, or lode. Reasonable fee.

WALTER B. LENHART, Mining Engineer
2919 E. Second St. Long Beach, Calif.

POSITIONS WANTED

POSITION WANTED AS SUPERINTENDENT, with a progressive stone company; 20 years' practical experience operating limestone quarries and crushing plants. Familiar with modern machinery, efficient handling of labor and equipment, low cost of production. Qualified to assume full charge of any size plant. Now open for engagement. Unquestionable references. Address Box 560, care of Rock Products, 330 S. Wells St., Chicago, Ill.

SUPERINTENDENT WITH FIFTEEN years' experience in construction and operation of sand and gravel plants producing up to two million tons annually wants position. Guarantees minimum cost and maximum production. Starting salary secondary. Ten years with one concern. Best references. Available immediately. Will go anywhere. Address Box 611, care of Rock Products, 330 South Wells Street, Chicago, Ill.

QUARRY SUPERINTENDENT DESIRES A permanent connection. 18 years' experience in operating trap rock, limestone quarries and crushing plants; also familiar with lime kilns and construction work. Excellent references. Address Box 449, care of Rock Products, 330 So. Wells Street, Chicago, Illinois.

OPEN FOR POSITION AS OPERATOR OR manager of lime or stone plant. Would consider small investment in a company of suitable rating. Address Box 602, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
35 Doane Street, Boston, Massachusetts.
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
Consultation **Design**
Examinations **Construction**
Reports **Supervision**

WE LOOK INTO THE EARTH
By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

DIAMOND CORE DRILLING
CONTRACTORS
FIRECLAY, ASPHALT, LIMESTONE, COAL AND ALL MINERALS
Light Gasoline Outfits
MOTT CORE DRILLING COMPANY
HUNTINGTON, W. VA.

Try cloverine fertilizer all crops
H. D. RUHM
Consulting expert on phosphate matters. Correspondence solicited. Will advise as to use of and furnish all brands and grades of phosphates.
In the Mt. Pleasant Phosphate Field
305 West Seventh Street Columbia, Tenn.

POSITIONS WANTED

GENERAL CEMENT PLANT OPERATOR—Qualified to assume full charge of any size plant. 18 years' actual experience as assistant chief chemist, quarry, mill, kiln, packing, maintenance, and construction foreman. 8 years full charge of all plant operations, maintenance and control of 8,000-barrel plant without rejection and very low operating cost. Location and position to start immaterial. Address Box 603, care of Rock Products, 330 South Wells Street, Chicago, Ill.

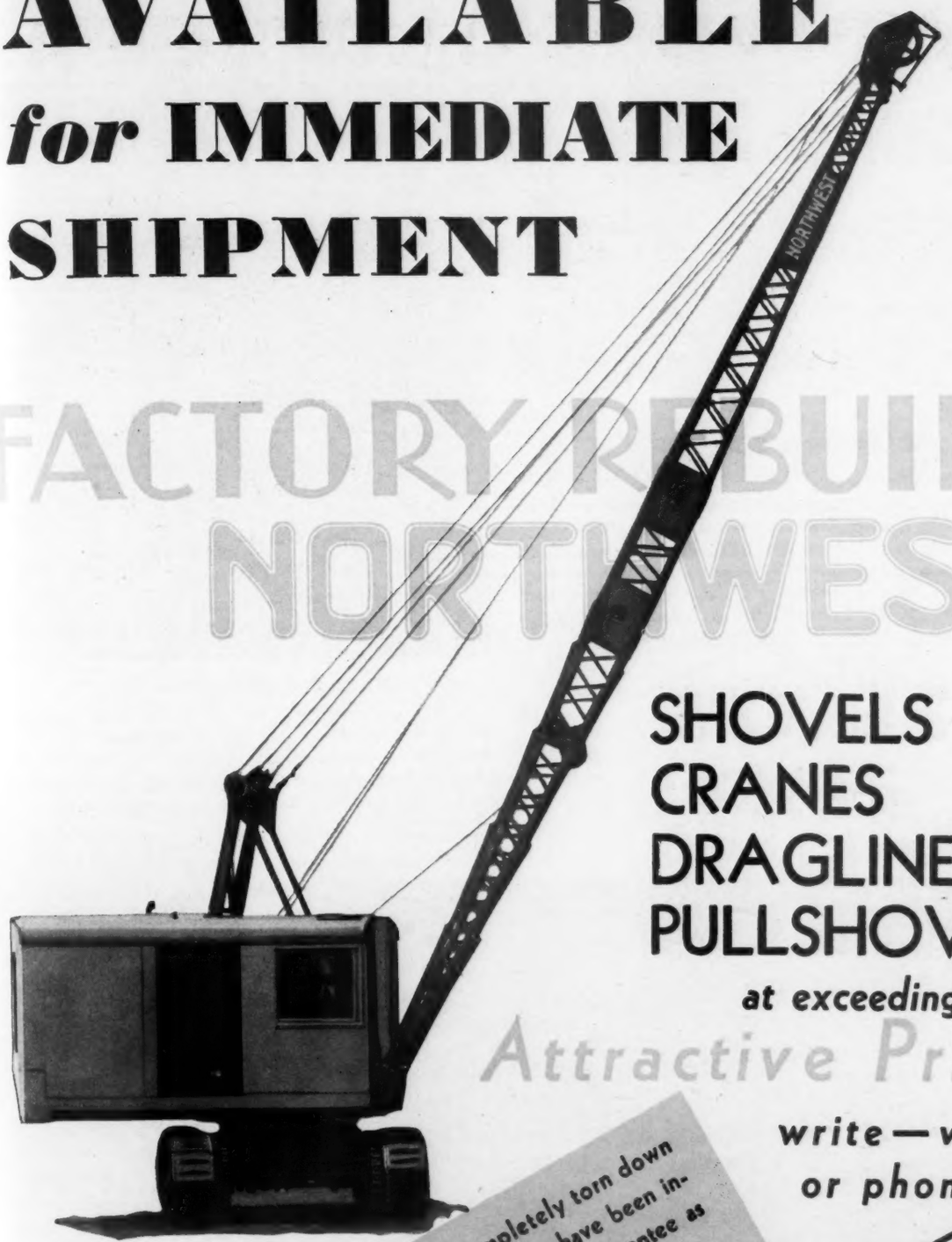
MECHANICAL AND SAFETY ENGINEER desires position. 36 years of age; mechanical and engineering college education; five years' experience in mechanical and safety engineering and five years selling experience. Full knowledge of modern machinery. Last employed by a leading cement company. Can furnish best reference. Address Box 616, care of Rock Products, 330 South Wells Street, Chicago, Ill.

OPERATING MANAGER. EXTENSIVE executive experience in stone and slag operations, plant layout and construction. Graduate engineer. Particular ability in effecting operating economies. Address Box 615, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

POSITIONS VACANT

SUPERINTENDENT WANTED FOR LIME plant located in eastern Pennsylvania. Only qualified man having production experience and good education will be considered. Address Box 612, care of Rock Products, 330 South Wells St., Chicago, Illinois.

AVAILABLE *for* IMMEDIATE SHIPMENT



FACTORY REBUILT NORTHWEST

SHOVELS
CRANES
DRAGLINES
PULLSHOVELS

at exceedingly

Attractive Prices

write—wire or phone!

These Machines have been completely torn down and rebuilt from the ground up. They have been inspected and tested and carry the same guarantee as to materials and workmanship as a new machine. Perhaps this is the solution to your excavation problems.

Northwest Engineering Co.
1834 Steger Building,
28 E. Jackson Blvd., Chicago, Ill.

Gentlemen: I am interested in a rebuilt machine of the type checked below. Please send complete information without obligating me in any way.

Name.....

Address.....

City..... *State*.....

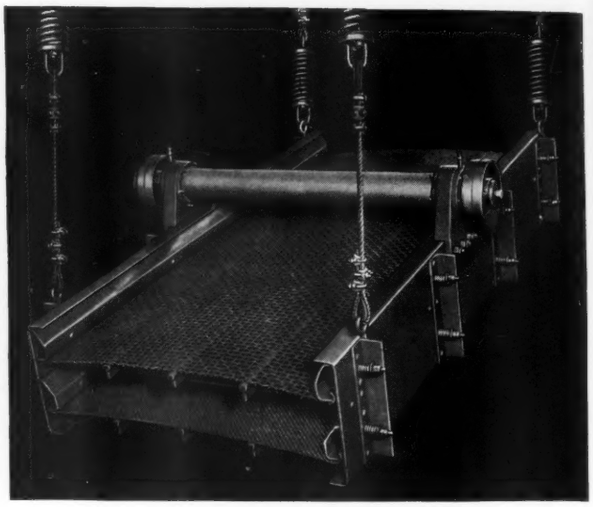
☐ Shovel ☐ Crane ☐ Dragline ☐ Pullshovel

Two Types *of* Screens
Which do you need in your plant?

ALLIS-CHALMERS vibrating screens are available in two types . . . in sizes suitable for every plant. They are used for sizing crushed stone, slag, ore, sand and gravel, coal and coke, wood chips, commercial fertilizer, in fact, nearly all kinds of materials sized for commercial purposes, either wet or dry.

Aero-Vibe Screens

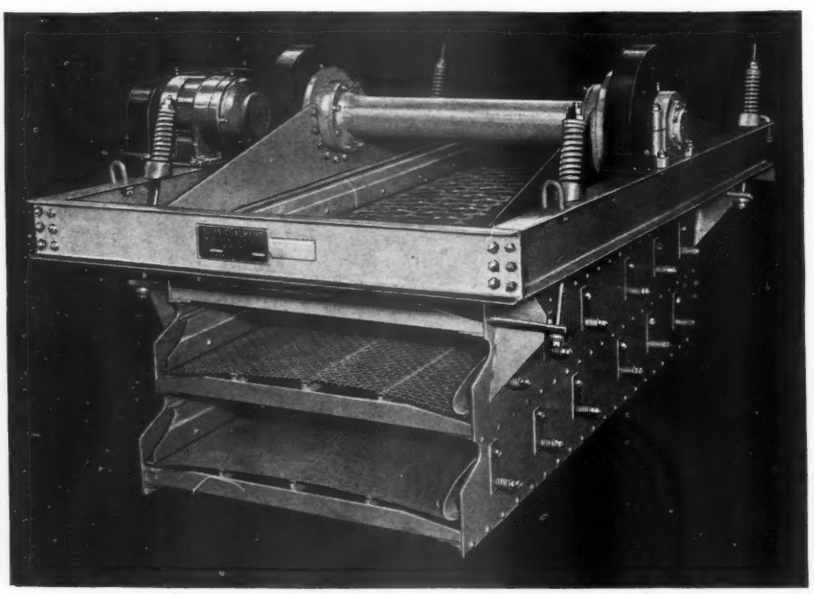
The "Aero-Vibe" screen "floats in the air" suspended from the supporting structure by cables and springs. A rapid, adjustable, vibrating motion is produced by counter-weighted wheels mounted on the drive shaft supported in anti-friction bearings above the screen body or vibrating member. Single and double deck "Aero-Vibe" screens are available from 1½ x 3 ft. to 4 x 10 ft. sizes for handling medium to fine size materials, and for limited tonnage.



Aero-Vibe Screens

Centrifugal Vibrating Screens

Style "B" Centrifugal screens are built with one, two, or three decks in sizes from 2 x 6 ft. to 5 x 14 ft. and are adaptable for heavy loads and the maximum range of material size. The screening action, which is equally intense for all tonnages, is transmitted to the Screen body or vibrating member by an eccentric shaft located above the screen and supported in anti-friction bearings. The screen body "floats" on balance springs reducing power and the load on the bearings; the entire screen is cable and spring suspended.



Style "B" Centrifugal Vibrating Screens

Crushing Plant Equipment

Gyratory Crushers
McCully and Newhouse
Non-Choking Concaves
Jaw and Roll Crushers
Revolving Screens
Vibrating Screens
Scrubbers and Washers
Elevators and Pan Conveyors
Feeders and Bin Gates
Friction and Electric Hoists
Grinding Machinery
Cement Mill Machinery
Mining Machinery
Electric Motors
Gearmotor Units
Texrope V-Belt Drives
Centrifugal Pumps
Air Compressors
Track-type Tractors
Road Machinery
Track-type Wagons
Tunnel Shovels

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee